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OF

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AMERICAN GEOGRAPHICAL SOCIETY.

OFFICERS AND COUNCILLORS, 1882.

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CHARTER OF INCORPORATION.

GRANTED APRIL 13, 1854.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. George Bancroft, Henry Grinnell, Francis L. Hawks, John C. Zimmerman, Archibald Russell, Joshua Leavitt, William C. H. Waddell, Ridley Watts, S. De Witt Bloodgood, M. Dudley Bean, Hiram Barney, Alexander J. Cotheal, Luther B. Wyman, John Jay, J. Calvin Smith, Henry V. Poor, Cambridge Livingston, Edmund Blunt, Alexander W. Bradford, and their associates, who are now or may become hereafter associated for the purposes of this act, are hereby constituted a body corporate by the name of "The American Geographical and Statistical Society," for the purpose of collecting and diffusing geographical and statistical information.

§ 2. For the purposes aforesaid, the said Society shall possess the general powers and privileges, and be subject to the general liabilities, contained in the third title of the eighteenth chapter of the first part of the Revised Statutes, so far as the same may be applicable, and may not have been modified or repealed; but the real and personal estate which the said Society shall be authorized to take, hold, and convey, over and above its library, and maps, charts, instruments, and collections, shall not at any time exceed an amount the clear yearly income of which shall be ten thousand dollars.

§ 3. The officers of said Society shall be a president, three vice-presidents, a corresponding secretary, a recording secretary, a librarian, and a treasurer and such other officers as may from time to time be provided for by the by-laws of the said Society.

§ 4. The said Society, for fixing the terms of admission of its members, for the government of the same, for changing and altering

the officers above named, and for the general regulation and management of its transactions and affairs, shall have power to form a code of by-laws, not inconsistent with the laws of this State, or of the United States, which code, when formed and adopted at a regular meeting, shall, until modified or rescinded, be equally binding as this act upon the said Society, its officers, and its members.

5. The Legislature may, at any time, alter or repeal this act.
6. This act to take effect immediately.

STATE OF NEW YORK, } ss.:
Secretary's Office, }

I have compared the preceding with the original law on file in this office, and hereby certify the same to be a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this
[L. S.] thirteenth day of April, one thousand eight hundred and fifty-four.

A. G. JOHNSON,
Deputy Secretary of State.

AMENDED CHARTER.

PASSED APRIL 8, 1871.

STATE OF NEW YORK, NO. 237, IN SENATE. *March* 7, 1871.—Introduced with unanimous consent, by Mr. Bradley; read twice, and referred to the Committee on Literature; reported favorably from said committee, and committed to the Committee of the Whole.

CHAP. 373.

AN ACT in relation to The American Geographical and Statistical Society.

PASSED April 8, 1871.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The name or corporate title of the said Society shall hereafter be The American Geographical Society of New York.

§ 2. The object of the said Society shall be the advancement of geographical science; the collection, classification and scientific arrangement of statistics, and their results; the encouragement of explorations for the more thorough knowledge of all parts of the North American continent, and of other parts of the world which may be imperfectly known; the collection and diffusion of geographical, statistical and scientific knowledge, by lectures, printed publications, or other means; the keeping up of a correspondence with scientific and learned societies in every part of the world, for the collection and diffusion of information, and the interchange of books, charts, maps, public reports, documents, and valuable publica-

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tions; the permanent establishment in the city of New York of an institution in which shall be collected, classified, and arranged, geographical and scientific works, voyages, and travels, maps, charts, globes, instruments, documents, manuscripts, prints, engravings, or whatever else may be useful or necessary for supplying full, accurate, and reliable information in respect to every part of the globe, or explanatory of its geography, physical and descriptive; and its geological history, giving its climatology, its productions, animal, vegetable, and mineral; its exploration, navigation, and commerce; having especial reference to that kind of information which should be collected, preserved, and be at all times accessible for public uses in a great maritime and commercial city.

§ 3. The power given by the act hereby accorded to the said Society, to take, hold, convey, manage, and make use of its real and personal estate, shall be understood as authorizing said Society to take and hold by gift, grant, bequest, devise, subject to all provisions of law relative to devises and bequests by last will and testament, or purchase real estate to the value of three hundred thousand dollars, and to invest its income, or its personal estate generally, so as to produce a regular annual income sufficient for the accomplishment of the purposes set forth in the first section of this act; but said annual income shall not exceed twenty-five thousand dollars annually.

§ 4. The said Society shall make an annual report of its proceedings to the Legislature.

STATE OF NEW YORK, }
Office of Secretary of State, } *ss.:*

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this twenty-
[L. S.] second day of May, in the year one thousand eight hundred and seventy-one.

DIEDRICH WILLERS, JR.,
Deputy Secretary of State.

BY-LAWS.

CHAPTER I.

TITLE.

The title of the Society is, "The American Geographical Society."

CHAPTER II.

OBJECTS.

The objects of the Society are, "The collecting and diffusing of geographical and statistical information."

CHAPTER III.

MEMBERS.

1. The Society shall consist of Fellows, Honorary, Corresponding, and *ex-officio* members.

2. Honorary members shall be chosen on account of their distinction in the science of geography or statistics, and not more than twelve of them shall hereafter be elected in any one year.

3. Corresponding members shall be chosen from those who have aided the advancement of geography or statistics.

4. *Ex-officio* members shall be foreign diplomatic representatives and consuls resident in the United States; and United States diplomatic representatives and consuls in foreign countries.

4. Fellows and Corresponding and Honorary members shall be elected as follows: All nominations of candidates shall be openly made in writing at a meeting of the Society, or the Council, by a member thereof, and, together with the name of the member making them, entered on the minutes. The persons thus nominated, when

approved by the Council and elected by the Society, shall, on payment of the initiation fee, if nominated as Fellows, and without such payment if nominated as Corresponding or Honorary members, become members of the Society accordingly.

6. Persons entitled to become *ex-officio* members of the Society shall, on the recommendation of the Council, be, by the Society, constituted and declared to be such members.

7. The name of any member of the Society may, on the recommendation of the Council, and by a vote of two thirds of the members present at a stated meeting of the Society, be dropped from the roll of its members.

CHAPTER IV.

INITIATION FEE AND ANNUAL DUES.

1. The initiation fee, including the dues for the current year, shall be, for a Fellow, ten dollars, to be paid immediately on election.

2. The annual dues thereafter shall be, for a Fellow, ten dollars, to be paid in advance.

3. Any Fellow of the Society, not in arrears, may commute for life all dues for fellowship by the payment at one time, if a Fellow, of one hundred dollars.

4. The name of any Fellow of the Society neglecting for two successive years to pay his annual dues, or at any time wholly refusing to pay them, may by the Council be erased from the list of Fellows of the Society.

5. The fiscal year of the Society shall, for all purposes, be the calendar year—that is, commence on the first day of January, and end with the 31st day of December in each year.

CHAPTER V.

OFFICERS.

1. The officers of the Society shall be a president, three vice-presidents, a foreign corresponding secretary, a domestic corresponding secretary, a recording secretary, a treasurer, and fifteen councillors; and these, together, shall form the Council of the Society.

2. The officers and members of Council elected at the next

annual election (except the president and treasurer) shall, at their first meeting, divide themselves into three classes, each to embrace one vice-president, one secretary, and five members of the Council; one of which classes shall hold office one year, one for two years, and another for three years, to be determined at said meeting by lot or otherwise. The president and treasurer shall always be elected annually; and at each annual election thereafter there shall be elected a vice-president, a secretary, and five members of Council, each for the term of three years.

3. All officers of the Society to be chosen at any election may be voted for on one ballot.

CHAPTER VI.

ANNUAL MEETING.

1. The annual meeting of the Society shall be held on the second Tuesday after the first day of January in each and every year hereafter, when the annual election of the officers of the Society shall take place; and if, from any cause, there shall be a failure of the annual election at the time above designated for that purpose, the same may be held on the Tuesday next following—that is, on the third Tuesday after the first day of January in each year—and of which due notice shall be given.

2. Every member of the Society, who has been such for twenty days or more, and who is not in arrears for his dues for the past year, shall be entitled to vote at the said election.

3. At the annual meeting of the Society the Council shall present a general report of its proceedings and of those of the Society during the past year, and the secretaries and the treasurer shall also present their annual reports.

CHAPTER VII.

MONTHLY AND SPECIAL MEETINGS.

1. The Society, unless otherwise specially ordered by the Society or the Council, shall hold its stated meetings for the transaction of business on the second Tuesday of each month of the year, except July, August, and September.

2. The president, or, in his absence, one of the vice-presidents, may, and upon the written request of five members, shall, call a

special meeting of the Society by giving three days' notice thereof in two daily newspapers published in the city of New York.

CHAPTER VIII.

ORDER OF BUSINESS.

1. At all stated meetings of the Society for the transaction of ordinary business the order of proceedings shall be as follows :

1. Reading of the Minutes.
2. Reports and Communications from Officers of the Society.
3. Reports from the Council.
4. Reports from Committees.
5. Nominations of Members.
6. Special Orders.
7. Unfinished Business.
8. Miscellaneous Business.
9. Papers Read and Addresses Delivered before the Society.

2. All propositions presented for the action of the Society at any of its meetings shall be in writing, when requested by the presiding officer or any member. A proposition thus presented, when seconded and the question thereon stated from the chair, shall be deemed to be in the possession of the Society and open for discussion, but may be withdrawn by the mover at any time before amendment or decision.

3. No member shall speak more than once upon the same question until all the other members present desiring to speak shall have spoken, nor more than twice on any question without leave of the Society.

CHAPTER IX.

QUORUM.

At all meetings of the Society nine members present shall constitute a quorum for the transaction of business.

CHAPTER X.

COMMITTEES.

All committees authorized by the Society shall, unless otherwise specially ordered, consist of three members each, and be appointed by the presiding officer.

CHAPTER XI.

PRESIDING OFFICER.

At all meetings of the Society, on the arrival of the appointed hour and the presence of a quorum, the president, or in his absence one of the vice-presidents, or in the absence of both a chairman *pro tem.*, shall immediately take the chair, call the meeting to order, and preside. He shall have only a casting vote. He shall preserve order and decide all questions of order, subject to an appeal to the Society. He shall also, unless otherwise specially ordered, appoint all committees authorized by the Society ; and at every annual election, before the opening of the polls, he shall appoint two tellers of the election.

CHAPTER XII.

SECRETARIES.

1. Foreign Corresponding Secretary.—It shall be the duty of the foreign corresponding secretary to conduct the general correspondence of the Society with individuals and associate bodies in foreign countries.

2. Domestic Corresponding Secretary.—It shall be the duty of the domestic corresponding secretary to conduct the Society's general correspondence with individuals and associate bodies in the United States.

3. Both the foreign and domestic secretaries shall keep in suitable books to be provided for that purpose, at the Society's rooms, true copies of all letters written by them respectively on behalf of the Society ; and shall preserve, on proper files, at the said rooms, all letters received by them on the same account ; and at each stated meeting of the Society or the Council, they shall respectively report their correspondence, and read the same, or such parts thereof as may be required.

4. In case of vacancy in the office of either of the corresponding secretaries, or in the absence or disability of either of these officers, the duties of both may be performed by the other corresponding secretary.

5. The Society may designate a particular officer, or appoint a committee to prepare a letter or letters on any special occasion.

6. Recording Secretary.—It shall be the duty of the recording

secretary to give due notice of the time and place of all meetings of the Society, and to attend the same. He shall keep fair and accurate minutes of the proceedings of the Society, and record the same, when approved, in the Society's Journal. He shall give immediate notice to the several officers and committees of the Society, of all votes, orders, resolves, and proceedings of the Society affecting them or appertaining to their respective duties. He shall prepare a list of the members of the Society entitled to vote, to be handed to the tellers before the opening of the polls at each annual election. He shall officially sign and affix the corporate seal of the Society to all diplomas and other instruments or documents authorized by the Society or Council. He shall have charge of the corporate seal, charter, by-laws, records, and general archives of the Society, except so far as they may be expressly placed under the charge of others. He shall certify all acts and proceedings of the Society, and shall notify the Council of the death, resignation, or removal of any officer or member of the Society. He shall have charge of the rooms of the Society, and shall perform all such other and further duties as may from time to time be devolved upon him by the Society or the Council. He, together with the Council, shall have the charge and arrangement of the books, maps, and collections belonging to the Society. He shall cause to be kept in the rooms of the Society a registry of all donations to the library or collections of the Society, acknowledge their receipt by letter to the donors, and report the same in writing to the Society at its next stated meeting.

7. All documents relating to the Society and under the charge of the secretaries respectively, shall be placed in such depositories in the rooms of the Society as the Council may provide and designate for that purpose.

CHAPTER XIII.

TREASURER.

The Treasurer shall have charge of and safely keep all contracts, certificates of stock, securities, and muniments of title belonging to the Society. He shall collect the dues and keep the funds of the Society, and disburse the same under the direction of the Council; and so often as the said funds in the hands of the treasurer shall amount to one hundred dollars, he shall deposit the same, in the

name of the Society, in some incorporated bank in the city of New York, to be designated for that purpose by the Council; and the said funds, thus deposited, shall be drawn out of the said bank on the check of the treasurer, countersigned by the chairman of the Council, and only for the legitimate and authorized purposes of the Society. The treasurer shall, previous to the annual meeting of the Society, prepare and submit to the Council for audit, a detailed account of his receipts and disbursements for account of the Society during the past year; and which annual account, duly audited, he shall present, with his general report, to the Society at its annual meeting.

CHAPTER XIV.

COUNCIL.

1. The Council shall have the management and control of the affairs, property, and funds of the Society, and shall designate an incorporated bank in the city of New York, where the said funds shall, from time to time as they accrue, be deposited by the treasurer.

2. It may frame its own by-laws, not inconsistent with the charter or by-laws of the Society.

3. It shall appoint the necessary agents, clerks, and servants of the Society, with such powers and duties, privileges and compensation as it may from time to time determine; and may at pleasure revoke such appointments, and make others in their stead.

4. It shall have power to fill, for the unexpired term, any vacancy that may occur in any of the offices of the Society.

5. It shall have power, at its discretion, to declare vacant the seat of any member of its own body (except the president and vice-presidents) who shall have been absent from its meetings for three successive months; and also by a vote of a majority of the whole Council to remove from its own body any member thereof for cause; but in such case it shall be the duty of the Council to report every such vacancy or removal to the Society, at its next stated meeting thereafter, when such cases shall be subject to review by the Society.

6. It shall not, without an approving vote of the Society at a stated meeting thereof, make any contract whereby a liability in amount above one thousand dollars may be incurred by the Society; nor

without such vote make any sale or disposition of the property of the Society exceeding that sum in value.

7. The Council may, in its discretion, remit the initiation fee or annual dues of any member of the Society.

8. No member of the Council shall receive any salary or pecuniary compensation for his services.

9. The Council shall hold stated meetings for the transaction of business at least once in every month, except the months of July, August, and September.

10. At all meetings of the Council, five members present shall constitute a quorum for the transaction of business.

CHAPTER XV.

GENERAL PROVISION AS TO DEBT.

No debt on account of the Society, beyond the funds in the treasury for its payment, shall for any purpose, at any time, be incurred; and if at any time it shall appear that there are resting upon the Society pecuniary obligations beyond the funds in the treasury for their liquidation, no appropriation of funds from the treasury whatever, except for the necessary current expenses of the Society, shall be made, until the said pecuniary obligation shall be fully discharged, or the funds necessary for their extinction shall have been set apart for that purpose.

CHAPTER XVI.

ALTERATION OF THE BY-LAWS.

No alteration in the by-laws of the Society shall be made unless openly proposed at a stated meeting of the Society, entered on the minutes, with the name of the member proposing the same, and adopted by the Society at a subsequent meeting, by a vote of two thirds of the members present.

CHAPTER XVII.

ADOPTION OF THE BY-LAWS.

The foregoing are hereby adopted and declared to be the by-laws of the Society; and all by-laws of the Society heretofore adopted are hereby rescinded and declared to be null and void.

HONORARY AND CORRESPONDING MEMBERS AND FELLOWS.

HONORARY MEMBERS.

BAKER, Sir Samuel W., F.R.S., F.R.G.S.
CONSTANTINE, the Grand Duke, President of the Imperial Russian Geographical Society, St. Petersburg.
DUFFERIN, the Earl of, Ambassador of Great Britain at Constantinople.
ELDER, Sir Thomas, Adelaide, South Australia.
ISMAÏL, ex-Khedive of Egypt.
LAYARD, Sir Austen Henry, D.C.L.
MARKHAM, Clements R., K.C.B., Secretary, Royal Geographical Society.
MCCLINTOCK, Admiral Sir Francis Leopold, LL.D.
MIDDENDORFF, Adolph Theodore von, Secretary of the Imperial Academy of Sciences, St. Petersburg.
NARES, Sir George S., R.N., K.C.B.
NORDENSKIÖLD, Professor A. E., Stockholm.
PEDRO II., Emperor of Brazil.
RAWLINSON, Major-General Sir Henry C., K.C.B., Vice-President of the Royal Geographical Society.
STRUVE, Professor Otto Wilhelm von, St. Petersburg.
WILCZEK, Count H., Vienna.

CORRESPONDING MEMBERS.

ABBE, Prof. Cleveland, Washington.
ALTAMIRANO, Ignacio, Mexico.
ALVORD, General Benjamin, U.S.A.
AMMEN, Rear-Admiral Daniel, U.S.N., Washington.
ARSENIEW, George, St. Petersburg.
ASBJÖRNSEN, P. C., Christiania, Norway.
BAKER, Commodore F. H., U.S.N., Norfolk, Va.
BALFOUR, David M., Boston, Mass.
BARANDA, Joaquin, Mexico.
BARCLAY, James T., M.D., Jerusalem.
BARNARD, Henry, LL.D., Hartford, Conn.
BARTLETT, John Russell, Providence, R. I.
BASAROFF, Ed. Ivan de, Stuttgart, Würtemberg.
BASTIAN, Dr. Adolph, Berlin.
BECKER, Prof. M. A., Vienna.
BEHM, Dr. E., Gotha.
BLACKIE, Walter G., Ph.D., F.R.G.S., Glasgow.

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Bom Retiro, Viscount, President of the Instituto Historico Geographico, Rio de Janeiro.
Botassi, Demetrius, Consul-General of Greece, New York.
Braine, Capt. D. L., U.S.N., Washington.
Brewer, Prof. Wm. H., New Haven, Conn.
Bright, John, M.P., London.
Bushnell, Rev. Albert, Gaboon, Africa.
Chaix, Prof. Paul, Geneva, Switzerland.
Chambers, William, LL.D. Edinburgh.
Chandles, W., F.R.G.S., London.
Danenhower, Lieut. J. W., U.S.N., Newport, R. I.
Do Canto, Dr. Ernesto, St. Michael's, Azores Islands.
Draper, Lyman, Madison, Wis.
Fritsch, Hugo O., New York.
Gardner, Prof. James T., Albany, N. Y.
Gilman, Daniel C., LL.D., President Johns Hopkins University, Baltimore.
Guyot, Prof. Arnold Henry, LL.D., Princeton, N. J.
Hague, J. D., New York.
Hancock, Prof. Wm. Neilson, LL.D., Dublin.
Hayden, Prof. F. V., Washington.
Hitchcock, Prof. C. H., Ph.D., Hanover, N. H.
Hochstetter, Dr. Ferdinand von, Vienna.
Hosmer, Dr. George, New York.
Hotchkiss, Maj. Fred., Staunton, Va.
Hough, Franklin B., M.D., Washington
Humphreys, Gen. A. A., U.S.A., Washington.
Hunt, Prof. T. Sterry, LL.D., Boston
Ismail Pacha, Governor-General of the Soudan.
Jackson, John P., Berlin.
Johnston, W. E., M.D., Paris.
Lacroze, Julius, C.E., Buenos-Ayres.
Lamansky, Eugene von, St. Petersburg.
Lefroy, Gen. Sir John Henry, B.A., London.
Lesseps, Ferdinand de, Paris.
Long, Col. C. Chaillé, Cairo.
Luce, Capt. S. B., U. S. N., Newport, R. I.
Malte-Brun, V. A., Hon. Sec'y of the Société de Géographie, Paris.
Mariscal, Ignacio, Mexico.
Marsh, Hon. G. P., LL.D., Rome.
Martin, Rev. W. A. P., President of the Imperial College, Pekin.
Mathews, F. A., U. S. Consul-General, Tangier, Morocco.
Maunoir, Charles, Paris.
Maury, Louis Ferdinand Alfred, Paris.
McCartee, D. Bethune, M.D., Summit, N. J.
Mello, Dr. T. G. M., Rio de Janeiro.
Morgan, Henry Jas., Ottawa, Canada.
Naprstek, V., Prague, Bohemia.
Nassau, Rev. R. H., Gaboon, Africa.
Negri, Cristoforo, Turin.
Newmarch, William, Hon. Sec'y of Statistical Society, London.
Olaneta, Col. José R. de, Spanish Army.
Ortiz, Angel D., Seville.
Packard, Prof., A. S., Jr., Providence, R. I.
Passmore, Frank B., C.E., New Zealand.
Peralta, Manuel M. de, London.
Poesche, Theodore, Washington.
Porto Seguro, Viscount, Envoy of Brazil, Vienna.
Pumpelly, Prof. R., Newport, R. I.
Rae, John, M.D., London.
Raimondi, Antonio, Lima, Peru.

RAYMOND, Capt. Chas. W., U.S.A., West Point, N. Y.
Rodgers, Rear Admiral John, U.S. Navy.
ROHLFS, Gerhard, M.D.,
ROMERO, Matias, Mexico.
ROTHROCK, J. T., M.D., Wilkesbarre, Pa.
SAPUCACHY, Viscount, Rio de Janeiro.
SCHLAGINTWEIT-SAKÜNLÜNSKI, Robert von, Giessen, Germany.
SCHUMACHER, Herman A., M.D., Consul-General of Germany, New York.
SCHUMACHER, John, Altona, Germany.
SCHUYLER, Eugene, Bucharest.
SELFRIDGE, Comm. T. O., U.S.N., Washington.
SEYMOUR, Horatio, LL.D., Utica, N.Y.
STANLEY, Henry M., Africa.
STARRING, Gen. F. A., Paris.
STEERE, J. B., Hongkong.
STEVENS, Henry, LL.D., London.
STONE, Gen. Chas. P., Cairo.
TILLEY, Sir S., Ottawa, Canada.
VAN CAMPEN, Saml. Richard, F.R.G.S., C.M.G.S.N., London.
VINCENT, Frank, Jr.
VIVIEN DE ST. MARTIN, Versailles.
WALKER, Gen. Francis A., New Haven, Conn.
WALLING, H. F., C.E., Washington.
WHEELER, Capt. Geo. M., U.S.A., Washington.
WILLIAMS, S. Wells, LL.D., New Haven, Conn.
WRIGHT, Gen. Horatio G., U.S.A., Washington.
WYMAN, Capt. R. H., U.S.N., Washington.
WYSE, Lieut.-Comm. Lucien N. B., Paris.
YOUNG, Jess., F.R.G.S., Wisbeach, England.

FELLOWS.

CORRECTED TO DECEMBER 31, 1882.

Date of Election.
1859 Arnoux, William H.
1859 Arnold, David H. (L. F.)
1859 Aymar, William. (L. F.)
1860 Acton, Thomas C.
1869 Auchmuty, Richard Tylden.
1871 Atterbury, Rev. Wm. W., D.D.
1872 Allen, Horatio M.
1873 Albert, Halpern.
1874 Alexander, Junius B.
1874 Arthur, Gen. Chester A.
1874 Aufermann, August.
1874 Auchincloss, Henry B.
1874 Acker, David D.
1874 Avery, Samuel P.
1874 Agnew, John T. (L. F.)
1874 Arnold, Richard.

Date of Election.
1874 Allen, Henry Wilder.
1874 Amy, Henry.
1874 Agnew, Alexander McL.
1874 Astor, W. W. (L. F.)
1874 Appleton, D. S.
1874 Anderson, Henry H.
1874 Alsop, William.
1875 Amsinck, Gustav.
1876 Appleton, Nathan.
1878 Austin, Chas. P.
1879 Austin, William.
1879 Astoin, Felix.
1879 Agostini, Joseph.
1879 Agnew, Cornelius R., M.D.
1879 Ashley, Lucien S.
1879 Astor, John Jacob. (L. F.)

1880 Anthony, James L.
1881 Andrews, John R.
1881 Abbett, Leon.
1881 Allen, Eben S.
1881 Armour, Herman O. (L. F.)
1881 Andrews, Henry C.
1882 Adams, Hugh W.

1852 Bancroft, George. (L. F.)
1852 Barney, Hiram. (L. F.)
1853 Brown, James M.
1853 Butler, Charles.
1856 Baker, Francis. (L. F.)
1856 Berry, Richard.
1856 Brevoort, J. Carson.
1859 Brown, James. (L. F.)
1859 Boorman, J. Marcus. (L. F.)
1859 Bernheimer, Isaac.
1859 Belmont, August. (L. F.)
1859 Barlow, S. L. M.
1861 Butterfield, Gen. Daniel.
1865 Banvard, John. (L. F.)
1868 Banks, David.
1868 Beckwith, N. M.
1868 Bennett, James Gordon.
1868 Bernheimer, Adolph.
1868 Bernheimer, Simon.
1868 Brady, John R.
1869 Bailey, Jas. Mühlenberg. (L. F.)
1869 Banyer, Goldsboro.
1869 Bickmore, Prof. A. S.
1869 Bierstadt, Albert.
1870 Butler, Cyrus.
1870 Botta, Prof. Vincenzo.
1870 Body, John E.
1870 Bishop, T. Alston. (L. F.)
1872 Brown, Walston H.
1873 Bailey, N. P.
1874 Bishop, D. W. (L. F.)
1874 Bien, Julius.
1874 Bartlett, Willard.
1874 Bissinger, Philip.
1874 Backus, Henry C.
1874 Ballin, Eugene S.
1874 Baldwin, Townsend B.
1874 Bates, Levi M.
1874 Barnes, John S.
1874 Barbour, Thomas. (L. F.)
1874 Bonner, Robert.
1874 Bonn, William B.
1874 Barnard, Horace.
1874 Barnard, F. A. P., LL.D.
1874 Benjamin, John.
1874 Butler, William Allen.
1874 Bartow, Morey H.
1874 Barr, William.
1874 Belding, Milo M.
1874 Buckley, Rev. Jas. M.
1874 Bookstaver, Henry W.
1874 Brownson, Lieut. W. H., U.S.N.
1875 Barney, Charles T.
1875 Beaman, Charles C., Jr.
1875 Bernheimer, J. A.
1875 Beckwith, Leonard F.
1875 Benjamin, E. B.
1875 Beekman, Gerard.
1875 Babcock, Gen. O. E., U.S. Army.
1875 Brownell, Silas B.
1875 Burgess, William J.
1875 Brown, Vernon H.
1875 Barnes, William.
1875 Beste, Henry.
1875 Bredt, Ernest.
1875 Bedle, Joseph D.
1875 Belknap, Capt. Geo. E., U.S.N.
1875 Bowie, Augustus J., Jr.
1876 Banks, James L., M.D.
1876 Baldwin, Commodore Charles H., U.S.N.
1876 Brower, John.
1876 Billings, Frederick.
1876 Bellew, F. H. T.
1877 Booth, George.
1877 Bixby, Robert F.
1877 Börs, Christian.
1877 Briggs, Prof. Charles A.
1877 Blanchard, George R.
1877 Blatchford, Eliphalet W.
1878 Bliss, Cornelius N.
1878 Brown, G. Melville.

1878 Barton, Oliver Grant. (L. F.)
1878 Brown, Rev. Philip A. H.
1878 Brand, James.
1878 Brown, J. Romaine.
1879 Brady, James T.
1879 Barattoni, C. A.
1879 Bowen, Gen. Edmund S.
1880 Bayard, Edward, M.D.
1880 Beach, Miles.
1880 Bamberger, A. E.
1880 Banks, D. S.
1881 Baldwin, Edwin.
1881 Babcock, Courtland G.
1881 Bartlett, Commander John R., U.S.N.
1881 Barber, Charles G.
1881 Brown, Augustus L.
1881 Baldwin, Christopher C.
1881 Babcock, Samuel D.
1881 Ballin, Frederick E.
1881 Backus, Henry Landon.
1882 Bamberger, Jacob F.
1882 Belton, Frank S.
1882 Brown, George H.
1882 Baldwin, Octavius D.
1882 Ballin, Gustave N.
1882 Bacon, Francis M.
1882 Babcock, George N.
1882 Barger, Samuel F.
1882 Barney, Newcomb C.
1882 Bowen, Francis C.
1882 Barclay, J. Searle.
1882 Byers, John.

1852 Colton, Joseph H. (L. F.)
1855 Conkling, Frederick A. (L. F.).
1855 Cooper, Peter.
1856 Cooley, James E. (L. F.)
1856 Cooper, Edward.
1856 Crooks, Ramsay. (L. F.)
1868 Catlin, N. W. Stuyvesant. (L. F.)
1868 Cisco, John J.
1868 Chapman, Joseph H.
1869 Cullum, Gen. George W., U.S. Army. (L. F.)
1870 Conklin, William A.
1872 Corse, Israel.
1872 Conklin, Eugene E.
1872 Crawford, Gen. S. W., U.S. Army.
1872 Clark, E. V.
1872 Cox, Samuel S.
1873 Coster, Charles H.
1874 Cruickshank, James, LL.D.
1874 Connery, T. B.
1874 Cowdrey, N. A.
1874 Curphey, James.
1874 Campbell, Allan.
1874 Church, Col. George E.
1874 Christern, F. W.
1874 Cockcroft, Jacob H. V.
1874 Chickering, Charles F.
1874 Comstock, Cornelius
1874 Constable, James M.
1874 Ceballos, J. M.
1874 Carter, Walter S.
1874 Caswell, Wm. H.
1874 Crerar, John.
1874 Crocker, David.
1874 Cruikshank, Edwin A.
1874 Crosby, J. Schuyler.
1874 Coates, Isaac T., M.D.
1874 Cochrane, Capt. Henry Clay, U.S.M.C.
1874 Colgate, James B.
1874 Constantine, Andrew J.
1874 Corning, Erastus.
1874 Cottenet, Francis.
1874 Cossitt, Frederick H.
1874 Coutan, Charles E.
1874 Conyngham, Wm. L.
1874 Crosby, Hiram B.
1874 Crocker, Geo. A.
1874 Crocker, Wm. Baylies.
1874 Chickering, George H.
1874 Carter, Oliver S.
1874 Catlin, Julius, Jr.
1874 Colgate, Robert.
1874 Curren, Robert.
1875 Clendenin, J. W.

1875 Cameron, R. W.
1875 Cushman, W. F.
1875 Cooper, George C.
1875 Champlin, John D., Jr.
1875 Cassebeer, Henry A., Jr.
1875 Chittenden, S. B., Jr.
1876 Clarke, W. H.
1876 Cullum, Mrs. George W. (L. F.

1876 Cornell, John B.
1876 Curtis, Benj. L.
1876 Curtis, Benjamin R.
1879 Cooper, James G.
1879 Church, Simeon E.
1879 Coddington, Gilbert S.
1879 Caldwell, R. A., M.D.
1879 Childs, George W.
1880 Calvin, Delano C.
1880 Clark, Lester W.
1880 Chamberlain, J. A.
1880 Cohen, Maurice S.
1880 Collins, John C.
1880 Cormack, John A.
1880 Caverley, William.
1880 Camp, W. A.
1880 Clymer, Edward M.
1880 Cronley, John E.
1881 Chaffee, Jerome B.
1881 Carnochan, J. M., M.D.
1881 Canfield, Charles B.
1881 Clinton, Henry L.
1881 Chandler, Nathan.
1881 Coddington, Thomas B.
1882 Cooper, Wm. B.
1882 Calhoun, William.
1882 Clarkson, Banger.
1882 Campbell, Franklin W.
1882 Coudert, F. R.
1882 Conkling, Rev. N. W.
1882 Chapin, Wm. Viall.
1882 Cass, Gen. George W.
1882 Carolin, William V.

1855 Daly, Chief-Justice C. P. (L. F.)
1855 Dunshee, Prof. Henry W.
1856 Douglas, Andrew E.
1856 Dodge, Wm. E.
1856 Dodge, Wm. E., Jr.
1856 Detmold, Wm., M.D.
1859 Dickerson, E. N.
1864 Detmold, Christian E.
1866 Darling, Wm. A.
1868 Dwight, Prof. Theo. W.
1868 Du Chaillu, Paul B.
1868 Dennis, Charles. (L. F.)
1870 Dash, John B.
1870 Davies, Alexander J. (L. F.)
1870 Drowne, Henry T.
1870 Dinsmore, William B.
1871 Daly, Joseph F.
1873 Delano, Franklin H.
1874 De Peyster, Gen. J. Watts. (L.F.)
1874 Diefendorf, Menzo.
1874 Davis, Noah.
1874 Dillon, Romaine. (L. F.)
1874 Dutilh, E.
1874 Decker, Charles A.
1874 Delafield, M. L.
1874 Dana, Charles A.
1874 Draper, Frank E.
1874 Devlin, Jeremiah.
1874 Decker, John J.
1874 Del Monte, Leonardo.
1874 Du Bois, Wm. A.
1874 De Castro, Diego.
1874 Davis, John G.
1874 Dalrymple, Alexander.
1874 Dunscombe, Richard T.
1874 Dun, R. G.
1874 Defendorf, Wilson.
1875 Darrow, William.
1875 Davies, Julien T.
1875 Du Bois, Eugene.
1875 Daniel, Edwin M.
1875 Davidson, Charles A.
1875 De Peyster, Frederic J. (L. F.)
1875 Delafield, Lewis L.
1875 Dommerick, L. F.
1876 Davis, Gilbert F.
1876 Drexel, Joseph W.

1877 Day, Henry M.
1877 Davis, Joseph Beale. (L. F.)
1878 Dana, Charles.
1878 Di Cesnola, Gen. L. B.
1879 Dahlgren, Charles B.
1879 Dodge, George E.
1879 Dana, Samuel B.
1880 Davis, Theodore M.
1880 Deane, John H. (L. F.)
1880 Dyckman, Isaac M.
1880 Du Bois, James G.
1880 Du Bois, Frederick N.
1880 Dash, Bowie.
1880 Dunn, John.
1880 Dexter, Henry. (L. F.)
1880 Deen, William M.
1881 Dean, F. M.
1881 Davies, H. B.
1881 Docharty, Augustus T. (L. F.)
1881 Dowd, William.
1882 Dunham, George H.
1882 Dunlap, Robert. (L. F.)
1882 Deems, Rev. Charles F.
1882 Dodge, Richard H.
1882 Dunbar, James M.

1859 Evarts, William M.
1864 Evans, Walton W.
1868 Emmet, Thomas Addis, M.D.
1874 Eaton, D. Cady.
1874 Ewen, John, Jr.
1875 Eaton, Dorman B.
1875 Eldridge, Titus B.
1875 Esterbrook, Richard, Jr.
1875 Ellis, John W.
1875 Elliott, John.
1875 Eimer, Charles.
1875 Ely, Richard S.
1875 Eads, Captain James B., C.E.
1877 Elderkin, John.
1878 Eno, John C.
1878 Ellis, John, M.D.
1878 Edson, Franklin.
1879 Earl, Ferdinand P.
1879 Elliott, Samuel.
1880 Eckert, Thomas T.
1881 Ellis, Ralph N.
1881 Evans, Silas C.
1882 Easton, Nelson S.
1882 Edmonds, Walter D.
1882 Ellis, William Dixon.
1882 Eddy, Ulysses D.
1882 Earl, Abraham L.
1882 Edinger, August H.
1882 Edwards, J. Pierrepont.
1882 Emerson, J. W.
1882 Emmons, John.
1882 Earle, Joseph P.

1854 Field, Cyrus W. (L. F.)
1856 Field, David Dudley.
1856 Field, B. H. (L. F.)
1857 Fish, Hamilton.
1859 Fogg, Wm. H. (L. F.)
1860 Field, Rev. H. M.
1864 Faile, Thomas H.
1868 Frohwein, Theobald.
1869 Forsyth, Rev. John.
1871 Fliess, Wm. M.
1873 Freedman, John J.
1873 Fithian, Freeman J.
1874 Farragut, Loyall.
1874 Foshay, James W.
1874 Fabbri, Egisto P.
1874 Fellows, John P.
1874 Francklyn, C. G.
1874 Fleet, Oliver S.
1874 Fatman, Lewis.
1874 Forman, Alexander.
1874 Fox, Baldwin N.
1874 Fougera, Edmund C.
1874 Fox, Austen G.
1875 Foulke, Thomas.
1875 Faile, Charles V.
1875 Fargo, James C.
1875 Fuller, Charles D.
1875 Ford, James B.
1875 Foote, Emerson.
1875 Folsom, George W.
1876 Fisk, Gen. Clinton B.

1877 Fiske, Andrew.
1877 Flagg, William J.
1878 Ferris, L. Murray, Jr.
1879 Fellows, John R.
1879 Ferris, Robert M.
1880 French, Stephen B.
1880 Fairchild, George M., Jr.
1881 Fleitmann, Ewald.
1881 Fairbanks, Joseph H.
1881 Farrington, E. A.
1881 Fearing, Charles F.
1881 Foote, Frederick W.
1881 Fearing, William H.
1882 Fairbanks, Leland.
1882 Fellows, Charles H.
1882 Falls, Thomas J.

1856 Greenwood, Isaac J.
1857 Greene, John W., M.D. (L. F.)
1859 Griswold, George. (L. F.)
1868 Gebhard, Wm. H. (L. F.)
1868 Gerry, Elbridge T. (L. F.)
1868 Green, Andrew H.
1868 Greene, Gen. G. S.
1869 Gilbert, Clinton.
1872 Gerard, James W.
1872 Grinnel, R. M. (L. F.)
1873 Gillmore, Gen. Q. A., U.S.A.
1873 Gedney, Frederick G.
1873 Glaubensklee, Theo. G.
1874 Gardner, Hugh.
1874 Green, John. (L. F.)
1874 Gunther, William Henry.
1874 Gunther, F. F.
1874 Gibert, Fred. E.
1874 Gibbs, Theodore K.
1874 Gottsberger, William S.
1874 Galpen, Horace.
1875 Greene, Lieut. F. V., U.S.A.
1875 Gordon, Robert.
1875 Greene, G. S., Jr., C.E.
1875 Garrison, Cornelius K.
1875 Gibson, James.
1875 Goepp, Charles.
1876 Gautier, Dudley G.
1877 Gaylord, Augustus.
1877 Guleke, H. F., M.D.
1878 Gillies, James W.
1879 Graves, Arthur B.
1879 Gay, Joseph E.
1880 Graeff, Albert I.
1880 Gorringe, Lt. Comdr. Henry H., U.S.N.
1880 Gunning, William J.
1881 Gallaway, R. M.
1881 Gomez, A.
1881 Green, George. (L. F.)
1881 Giles, John C.
1881 Grace, William R. (L.F.)
1881 Garland, James A.
1881 Gallatin, James.
1882 Gillespie, Col. G. L.
1882 Gallaher, S. C.
1882 Gilbert, William E.
1882 Gallup, Albert.
1882 Gardiner, J. Graham.
1882 Gade, Frederick W.
1882 Garretson, Frederick P.

1856 Hewitt, Abram S.
1856 Hunt, Wilson G.
1858 Holton, David P., M.D, (L. F.)
1859 Henderson, John C.
1859 Havemeyer, John C. (L. F.)
1864 Hammond, Henry B.
1868 Huntington, Daniel. (L. F.)
1868 Hurlbert, William H.
1868 Hoguet, Robert J.
1868 Hall, Elial F.
1868 Hadden, John A. (L. F.)
1868 Hallock, Mrs. Frances.
1870 Hawkes, Prof. W. Wright.
1870 Havens, Charles G.
1870 Harrison, Prof. Thomas F.
1871 Hamilton, Alexander, Jr.
1871 Hand, Clifford A.
1872 Hammersley, John W. (L. F.)
1872 Hawkins, Dexter A.
1872 Holbrook, Levi.
1873 Havemeyer, Theo. A.

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1874 Hamersley, A. Gordon. (L. F,)
1874 Hamersley, Louis C. (L. F.)
1874 Hancock, Gen. Winfield S., U.S.A.
1874 Hay, John.
1874 Hitchcock, Rev. Roswell D., D.D.
1874 Havemeyer, Hector C.
1874 Hoguet, Henry L.
1874 Hoyt, Oliver.
1874 Hurlbert, Henry A. (L. F.)
1874 Hutton, Benjamin H.
1874 Haydock, George G.
1874 Haines, John P.
1874 Hinton, John H., M.D. (L. F.)
1874 Hendricks, M. M.
1874 Havemeyer, James.
1874 Holbrook, E. F.
1874 Hoe, Richard M.
1874 Harper, Nathan.
1874 Hunter, Charles F.
1874 Hendricks, Edmund.
1874 Hendricks, Joshua.
1874 Hatch, Rufus.
1874 Huntington, C. P. (L. F.)
1874 Hunter, Lieut. Edward, U.S.A.
1874 Hoyt, Harlow M.
1875 Hubbard, Prof. O. P.
1875 Hammond, Wm. A., M.D.
1875 Houston, Col. D. C., U.S.A.
1875 Hoadley, John C.
1875 Hughes, Wm. H. T.
1875 Hoppenstedt, G. L.
1875 Hanemann, John F.
1875 Howland, Meredith.
1875 Hyde, Henry B.
1875 Harper, P. J. A.
1875 Hazen, Gen. W. B., U.S.A.
1875 Harris, Siegmund.
1875 Hun, Leonard G.
1876 Heminway, Albert G.
1876 Holt, Henry.
1876 Halsted, Major Geo. B.
1876 Holman, Frank E.
1876 Hoes, Wm. M.
1876 Hatfield, J. B. T.
1877 Houghton, Prof. Walter R.
1878 Howe, George S.
1878 Hermann, Henry. (L. F.)
1878 Hinman, Wm. K.
1878 Holden, Horace.
1878 Hitchcock, Hiram.
1879 Hamilton, William G.
1879 Harris, Col. Robert.
1879 Hayes, A. A., Jr.
1879 Hamilton, Capt. F. B., U.S.A.
1880 Hall, Hayden H.
1880 Howard, William Lee.
1880 Hickox, Charles R.
1881 Hinman, Russell.
1881 Henderson, Thomas, Jr.
1881 Hunt, Rev. M. A., O.M.I.
1881 Hoffman, Charles B.
1881 Hamilton, Robert Ray.
1881 Haven, George Griswold.
1882 Holme, Leicester P.
1882 Hascall, Theodore F.
1882 Hamilton, Dr. J. B.
1882 Higginson, James J.
1882 Hawk, William S.
1882 Hoag, Dr. W. E.

1859 Ireland, John B.
1874 Ives, Fred'k E.
1874 Iselin, Adrian, Jr.
1879 Inman, William H.
1879 Isham, Charles H.
1881 Ives, Brayton. (L. F.)
1882 Ijams, John T.
1882 Imbrie, H. T.

1852 Jay, John. (L. F.)
1852 Jones, John D. (L. F.)
1868 Johnson, Hezron A.
1871 Jones, Walter R. T.
1874 Judson, Wm. D.
1874 Janssen, Gerhard.
1874 Jesup, M. K. (L. F.)
1874 Jaffray, Edward S.
1874 Jenkins, Wm. L.
1874 James, D. Willis.

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1874 Jameson, Joseph A.
1874 Jordan, Conrad N.
1874 Jones, George.
1874 Jaffray, Robert.
1878 Jones, George H.
1878 Judson, Capt. J. A., C.E.
1879 Jay, William.
1880 Jones, Frederick W.
1880 Jewett, George L.
1880 Jenkins, Silvanus F.
1881 Jewett, Hugh J.
1881 Johnson, Bradish, Jr.
1882 Jasper, John.
1882 Jenkins, Henry W.

1854 Kennedy, Robert Lenox.
1869 Kelly, Eugene.
1870 Kühne, Frederick.
1872 Kendrick, Col. H. L., U.S.A.
1873 Kennan, George.
1874 King, Edward.
1874 Kearney, Joseph R.
1874 Kunhardt, Henry R.
1874 Kingsland, Wm. M. (L. F.)
1874 Kidder, Henry P. (L. F.)
1874 Kalbfleisch, Charles H.
1874 Keck, Thomas.
1874 Knower, John.
1874 King, David, Jr.
1875 Knapp, Herman, M.D.
1876 Knauth, Percival.
1877 King, Clarence.
1877 Kane, Gen. Thomas. L.
1878 Kernochan, Jas. Lorillard. (L. F.)
1879 Kane, S. Nicholson.
1880 Kidder, A. S., M.D.
1880 Keene, James R. (L. F.)
1881 Kennedy, John S. (L. F.)
1881 Kane, Grenville. (L. F.)
1881 Kirsch, Louis.
1882 King, Le Roy.
1882 King, George Gordon.
1882 King, John S.
1882 King, Vincent C. (L. F.)

1852 Livingston, Cambridge. (L. F.)
1857 Low, A. A.
1859 Lathers, Richard. (L. F.)
1868 Lawrence, Abraham R.
1869 Lawrence, John S. (L. F.)
1870 Loew, Frederick W.
1870 Lyman, Edward H. R.
1871 Letson, Robert S.
1871 Larremore, Richard L.
1871 Lee, Ambrose.
1872 Libby, William. (L. F.)
1874 Lauterbach, Edward.
1874 Livingston, Robert J. (L. F.)
1874 Langdon, Walter. (L. F.)
1874 Lorillard, Peter.
1874 Lorillard, George L.
1874 Livingston, John A.
1874 Livingston, Robert E.
1874 Littlejohn, James.
1874 Lawton, Walter E.
1874 Lawrence, Jos. B.
1874 Legget, Francis W.
1874 Le Comte, Joseph.
1874 Lewis, Walter H.
1874 Lawson, Leonidas M.
1874 Lane, George W.
1874 Lawrence, Samuel B.
1874 Lesher, Stephen R.
1875 Low, Seth.
1875 Lawrence, George N.
1876 Low, A. Augustus.
1876 Lindau, Leopold.
1877 Lockwood, Le Grand.
1877 Latrobe, John H. B.
1878 Loubat, J. F., LL.D. (L. F.)
1878 Leon, Nestor Ponce de.
1879 Levy, Augustus H.
1880 Lang, Alexander.
1880 Learned, Edward.
1880 Lee, William H.
1881 Libbey, William, Jr. (L. F.)
1881 Langdon, Woodbury G. (L. F.)
1881 Little, Joseph J.
1881 Livermore, Edwin R.
1881 Lee, J. Bowers.

1882 Lambert, Edward.
1882 Langdon, Woodbury.
1882 Lamont, Lansing.
1882 Ladd, William F.
1882 Le Roy, Herman R.
1882 Lapham, Lewis H.
1882 Lamborn, Robert H.

1852 Myers, Col. T. Bailey. (L. F.)
1853 Moore, George H. (L. F.)
1856 Morgan, E. D.
1856 Monroe, Ebenezer.
1856 Manners, David S.
1859 MacMullen, John.
1859 Morrell, Wm. H. (L. F.)
1859 Moore, Frank. (L. F.)
1863 May, Lewis.
1863 Moore, W. H. H. (L. F.)
1864 Morton, Levi P.
1868 Morrison, Henry.
1868 Moreau, John B.
1868 Martin, Isaac P.
1868 Marquand, Henry G.
1868 Marsh, Luther R.
1868 McClure George.
1869 Moore, Henderson.
1870 Marbury, Francis F.
1870 Murray, D. Colden.
1870 Miles, Edward D.
1872 Meyer, F. William.
1872 Matthews, Edward. (L. F.)
1872 Marié, Peter. (L. F.)
1873 Moore, C. B.
1874 Morris, Henry L.
1874 Mailler, W. H.
1874 Marble, Manton.
1874 Morrison, Edward.
1874 Morgan, W. F.
1874 Miller, Philip S.
1874 Moir, James.
1874 Morgan, J. Pierpont. (L. F.)
1874 Myers, John K.
1874 Martin, John M.
1874 McAlpine, David H.
1874 Merrall, William J.
1874 Moulton, Clarence F.
1874 Miller, Geo. Macculloch.
1875 Mitchell, Edward.
1875 Macy, Arthur.
1875 Marcus, Arnold.
1875 Meyer, Theo. F. H.
1875 Mott, Henry A., Jr.
1875 Monheimer, Joseph A.
1875 Magoun, George C.
1875 Maclay, Moses B.
1875 Martin, Bradley.
1875 Meyer, L. H.
1875 McLanahan, Geo. William.
1876 Mitchell, W. Howard.
1876 Mattson, Morris, M.D.
1877 Matsell, George W.
1878 Morison, John C.
1878 Merrick, William H.
1878 Montant, Alphonse.
1878 Musgrave, Thomas B. (L. F.)
1878 Mason, Lieut. T. B. M., U.S.N. (L. F.)
1879 Marshall, William I.
1879 Mather, Frederick E.
1879 Motz, Ferdinand.
1879 Miller, John Bleecker.
1879 Montieth, James.
1880 Mills, D. O. (L. F.)
1880 Mason, Thomas D.
1880 Mackenzie, Lieut. M.R.L., U.S. Navy.
1880 Massey, Wm. M.
1881 McGee, Flavel.
1882 Marquand, John P.
1882 Marsh, Caleb P.
1882 Middleton, Austin D.
1882 McWilliams, John.
1882 Mury, Rev. Mylton.
1882 McKnight, C. H.
1882 Moore, W. T.
1882 Mead, Erastus F.
1882 Markoe, F. H., M.D.
1882 Mills, Samuel M.
1882 McElrath, Thomas.
1882 Morgan, W. R., Jr.

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1870 Neilson, William H.
1873 Neilson, Frederic.
1874 Newell, John.
1874 Niles, William W.
1874 Newcombe, Isaac B.
1875 Northrop, A. L.
1880 Nelson, William, Jr.
1882 North, Thomas M.
1882 Nicholson, Granville.
1882 Nesbet, John L.
1881 Naylor, Joseph.
1882 Nelson, Richard.

1874 Ottendorfer, Oswald. (L. F.)
1874 Osgood, Franklin.
1874 Olyphant, Robert M.
1874 Oakley, E. Benedict.
1874 Owen, Frederick N.
1875 Otterbourg, Marcus.
1875 Ottiwell, John D.
1875 O'Connor, Thomas H.
1875 Opdyke, William S. (L. F.)
1876 Olmsted, Fred'k Law.
1876 Olmstead, Dwight H.
1877 O'Gorman, Richard.
1877 Ogden, Isaac C., Jr.
1878 Osgood, Prof. Howard.
1879 O'Gorman, Richard, Jr.
1879 O'Brien, Thomas S.
1880 O'Shaughnessy, John W. (L. F.)
1881 Oakley, Henry A.
1882 Oelrichs, Herman.
1882 Osborn, W. H. (L. F.)
1882 Oppenheim, Edward L.
1882 Osgood, William H.
1882 Olney, James B.
1882 Otis, Col. Charles G.

1852 Prime, Frederick. (L. F.)
1852 Poor, Henry V. (L. F.)
1852 Pierrepont, Henry E. (L. F.)
1855 Pierrepont, Edwards.
1857 Pyne, Percy R.
1859 Purser, George H.
1859 Prime, Fred'k E. (L. F.)
1860 Phelps, Royal. (L. F.)
1862 Phillips, George W.
1868 Powers, William P.
1868 Paulison, John P.
1871 Potter, Howard.
1871 Peabody, Charles A.
1872 Parish, Henry.
1873 Plum, Elias.
1874 Parker, Willard, M.D.
1874 Peake, William I.
1874 Peabody, Arthur J.
1874 Penfold, William Hall.
1874 Phelps, I. N.
1874 Potter, Orlando B.
1874 Pondir, John.
1874 Paris, Sherman.
1874 Preble, John Q.
1874 Porter, John K.
1874 Packer, Elisha A.
1874 Powers, George J.
1874 Pellew, Henry E.
1874 Prichard, William M.
1875 Prentice, W. P.
1875 Pope, Gen John, U.S.A.
1875 Pfund, Anton.
1875 Peipers, Hugo.
1875 Porter, Gen. Horace.
1876 Parsons, Levi.
1876 Plum, James R.
1876 Palmer, Gen. W. J.
1878 Parsons, Edwin.
1880 Pinchot, James W.
1880 Powell, Wilson M.
1881 Post, Charles A.
1882 Parsons, William. (L. F.)
1882 Parsons, Wm. Barclay.
1882 Pallen, Montrose A.
1882 Perkins, C. Lawrence.
1882 Parrish, James C.
1882 Pell, Wm. Cruger.
1882 Parsons, Joseph H.
1882 Percival, James H.
1882 Parsons, Samuel.
1882 Paton, John.
1882 Platt, Hon. Thos. C.

1882 Peck, Walter J.
1882 Parsons, John E.
1882 Parsons, Charles.
1882 Peck, Charles M.
1882 Phillips, Charles H.
1882 Payton, Rev. John R.
1882 Parsons, Wm. Edwin. (L. F.)
1882 Peterson, H. G.

1882 Quackenbos, Dr. Henry F.

1854 Rutherford, L. M.
1856 Randolph, Anson D. F.
1856 Remsen, William. (L. F.)
1856 Riker, John H.
1859 Rapallo, Charles A.
1859 Reckendorfer, Joseph. (L. F.)
1861 Rogers, C. B. (L. F.)
1868 Raven, Anton A.
1868 Rose, Cornelius.
1872 Robbins, Chandler. (L. F.)
1873 Reinhart, B. F. (L. F.)
1874 Reid, Whitelaw.
1874 Rives, Francis R.
1874 Richard, Auguste.
1874 Rogers, H. Livingston.
1874 Riker, William J.
1874 Requa, James M.
1874 Reynes, Jaime.
1874 Rhoades, John H.
1874 Ramsey, Charles G.
1874 Ransom, F. A.
1874 Rhoades, Lyman.
1875 Roosevelt, Clinton.
1875 Rives, G. L.
1875 Roberts, Nathan B.
1875 Read, J. Meredith.
1875 Rose, Charles.
1875 Rosenfeld, Isaac.
1876 Ross, William B.
1877 Rose, Theodore.
1877 Rice, A. Thorndike.
1877 Roome, William P.
1878 Roorback, Orville A.
1878 Rainey, Thomes, M.D.
1879 Redmond, James Morton.
1879 Rhinelander, Miss J. (L. F.)
1880 Robinson, Mrs. John A. (L. F.)
1881 Randolph, J. C. F.
1881 Robbins, George A.
1881 Rhinelander, Frederick W.
1882 Rhinehart, E.
1882 Ray, James D.
1882 Robbins, S. H.
1882 Reed, Wm. G.
1882 Rhinelander, T. J. O.
1882 Raven, Richard M.
1882 Redding, W. E.
1882 Riddle, Wm. Q.
1882 Raynor, Samuel.
1882 Rath, Nicholas.
1882 Rolston, Roswell G.
1882 Reynolds, Charles B.
1882 Rhinelander, Charles.
1882 Rathborne, C. L.

1853 Smith, James O., M.D.
1854 Sewell, Henry F.
1856 Spofford, Paul N.
1856 Schermerhorn, Wm. C.
1856 Sherman, W. Watts.
1859 Schell, Augustus. (L. F.)
1859 Schultz, John H. (L. F.)
1860 Stout, Francis A. (L. F.)
1868 Seward, Clarence A.
1868 Shea, George.
1869 Savage, John. (L. F.)
1869 Strebeigh, Robert M.
1870 Schell, Richard. (L. F.)
1870 Sherwood, John.
1870 Schafer, Samuel M.
1870 Schafer, Simon.
1870 Seligman, James.
1870 Seligman, Jesse.
1871 Shaler, Gen. Alexander.
1871 Swan, William H.
1872 Stern, Myer.
1872 Stengel, Prof. Frederick.
1872 Steiger, E.
1872 Stuyvesant, Rutherfurd. (L. F.)

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1873 Smith, James M.
1873 Slevin, Thomas E.
1873 Sturges, Frederick.
1873 Spencer, James C.
1873 Scott, Julian. (L. F.)
1873 Southworth, Alvan S. (L. F.)
1873 Sturgis, Frank K. (L. F.)
1874 Sands, Harry M.
1874 Steinway, William.
1874 Storrs, Charles. (L. F.)
1874 Sands, Philip J.
1874 Smith, Samuel Drake
1874 Sloan, Samuel.
1874 Schermerhorn, F. Augustus.
1874 Stuyvesant, Robert R.
1874 Scott, Col. Henry L.
1874 Scudder, Henry J.
1874 Stuart, Joseph.
1874 Strong, W. L. (L. F.)
1874 Steward, D. Jackson.
1874 Stevens, Alexander Henry.
1874 Sherman, Benjamin B.
1874 Shethar, Samuel.
1874 Sheafe, J. F.
1874 Schieffelin, Samuel B.
1874 Stiger, William E.
1874 Stillwell, Benjamin M.
1874 Sawyer, Warren.
1874 Sands, Andrew H.
1874 Schaus, William.
1874 Simkins, N. S., Jr.
1874 Spinney, Joseph S.
1874 Salomon, Edward.
1874 Sewell, Robert.
1874 Striker, J. A.
1875 Stanford, William H.
1875 Smith, Lewis Bayard.
1875 Smith, Charles Stewart.
1875 Stewart, Col. Charles S., U.S.A.
1875 Sturges, Henry C.
1875 Schultz, Carl H.
1875 Sandford, Elliott. (L. F.)
1875 Stranahan, J. S. T.
1875 Schofield, Gen. John M., U.S.A.
1875 Schieffelin, H. Maunsell.
1875 Sibley, Gen. Henry H., U.S.A.
1875 Schiff, Jacob H.
1875 Strazburger, Oscar.
1875 Schlesinger, Alfred.
1875 Smith, Apollos.
1875 Smith, Augustine.
1876 Smith, Harsen H.
1876 Sibley, Hiram W.
1876 Spaulding, Henry F.
1876 Smith, Dwight, M.D.
1876 Stryker, Gen. William S.
1876 Stone, A. B.
1877 Schuyler, Philip.
1877 Shearman, William P.
1877 Sandford, Henry S.
1877 Sanger, Major Joseph P., U.S.A.
1877 Schaff, Rev. Philip, D.D.
1878 Scott, James.
1878 Stewart, William Rhinelander.
1878 Sanford, A. Wright.
1878 Sands, William R.
1878 Smith, S. Newton.
1878 Smull, W. P.
1878 Sabla, Theodore de Joly de.
1879 Saltus, Edgar Evertson.
1879 Simion, Leonhard.
1879 Smith, Herbert H.
1879 Stone, R. C.
1879 Speir, Francis, Jr.
1879 Stevens, Frederick W. (L. F.)
1879 Smith, E. Reul. (L. F.)
1879 Shields, Prof. Charles W.
1879 Stetson, Francis Lynde.
1879 Squires, Grant.
1880 Southwick, Henry K.
1880 Starr, Theodore B.
1880 Suydam, John R., Jr.,
1880 Smythe, Henry.
1880 Stark, L. J. N.
1880 Stokes, George H.
1880 Savery, Bartlett M.
1880 Shepherd, Sherringham A.
1881 Stone, Joseph F.
1882 Sass, Dr. Louis F.
1882 Schuyler, Spencer D. (L. F.)

1882 Schuyler, Peter C.
1882 Samson, Felix.
1882 Sayre, Lewis A., M.D. (L. F.)
1882 Speir, Archibald W.
1882 Scott, George S.
1882 Skidmore, Wm. L.
1882 Sibley, Simeon W.
1882 St. John, Wm. P.
1882 Sheffield, Dr. Lucius T.
1882 Scribner, Charles.

1856 Tiffany, Charles L.
1856 Townsend, Randolph W.
1859 Tracy, Charles.
1868 Taylor, Douglas.
1868 Tilden, Samuel J.
1870 Tuckerman, Lucius.
1870 Thomson, James.
1872 Tower, Gen. Z. B., U.S.A.
1874 Thompson, David G. (L. F.)
1874 Tiemann, Peter C.
1874 Tefft, Erastus T.
1874 Thorne, Jonathan.
1874 Trevor, John B.
1874 Taylor, Alfred J.
1874 Thorne, William H.
1874 Turner, Herbert B.
1874 Terry, Comdr. Edward, U.S.N.
1875 Taintor, Charles M.
1875 Terry, Gen. Alfred H., U.S.A.
1875 Toel, William.
1875 Terbell, Henry S.
1876 Tappan, J. Nelson.
1876 Totten, Lieut. George Mansfield, U.S.N.
1876 Terry, Rev. Roderick.
1877 Tillinghast, William H.
1877 Talcott, James. (L. F.)
1878 Tucker, Rev. William J., D.D.
1878 Taylor, Rev. Wm. M., D.D.
1879 Thompson, J. P.
1879 Turnbull, Robert J.
1880 Tailer, William H.
1881 Thompson, R. H.
1881 Travers, J. P.
1881 Taylor, A. D.
1882 Thurber, H. K.
1882 Taber, Henry M. (L. F.)
1882 Thomson, Eugene.
1882 Tailer, Edward N. (L. F.)
1882 Terry, John T.
1882 Taintor, Giles E.

1854 Viele, Gen. Egbert L.
1868 Van Santvoord, C.
1869 Vanderpoel, Aaron J.
1870 Van Brunt, Charles H.
1874 Voorhis, William.
1874 Vanderbilt, William H.
1874 Vincent, Frank, Jr.
1874 Van Rensselaer, K.
1875 Vance, Samuel B. H.
1875 Van Buren, John D., Jr.
1875 Valentine, Lawson.
1875 Von Post, H. C. (L. F.)
1875 Vanderpoel, A. Ernest.
1875 Verhuven, Henry F.
1876 Van Hoesen, George, M.
1876 Van Brunt, Cornelius.
1877 Vanderbilt, Cornelius.
1877 Voorhees, Charles H.
1878 Vanderbilt, William K. (L. F.)
1879 Voorhis, John R.
1880 Von Hesse, Christern.
1880 Van Alen, James H.
1880 Van Tassell, Frank L.
1881 Vantine, A. A.
1882 Vail, M. M.
1882 Vincent, Rev. Marvin R.

1854 Webb, William H.
1854 Wetmore, Samuel. (L. F.)
1854 Witthaus, G. H. (L. F.)
1859 Ward, George Cabot. (L. F.)
1860 Winston, Frederick S.
1866 Wendell, Jacob.
1868 White, Alexander M.
1869 Weber, Leonard, M.D.
1870 Webster, Sidney.
1870 Wilson, Gen. Jas. Grant. (L. F.

1870 Wright, E. Kellogg.
1870 Weston, Theodore C. E.
1870 Ward, T. W.
1872 Wetmore, Wm. Boerum. (L. F.)
1872 Williams, Stephen C. (L. F.)
1872 Wells, Jacob.
1873 Weiner, Joseph, M.D. (L. F.)
1874 Weyman, Charles S.
1874 Waite, Chief-Justice M. R.
1874 Wheeler, Everitt P.
1874 Wadsworth, Julius.
1874 Wetmore, George P. (L. F.)
1874 Willets, Samuel.
1874 Wyckoff, Jacob F.
1874 Wilder, Marshall P.
1874 Walraven, Ira E.
1874 Wooster, George H.
1875 Work, J. Henry.
1875 Wheeler, John V.
1875 White, Charles Trumbull.
1875 Wilcox, Franklin A.
1875 Wilkes, George.
1875 Warner, Lewis T., M.D.
1875 White, David C. E.
1875 Winslow, Gen. Edward F.
1875 Whitehead, Comdr. Wm., U.S.N.
1875 White, Loomis L.
1875 Wissman, J. F.
1876 Wedemeyer, A. J. D.
1876 Wrigley, Henry E., C. E.
1877 Ward, W. S.
1877 Waters, James T.
1877 Woodruff, Col. D., U.S.A.
1878 Whitehead, Henry M.
1878 Witherbee, S. H.
1878 Wood, Isaac F.
1878 Watson, William.
1878 Whittemore, Charles.
1878 Whittemore, Thomas W.
1879 Williams, Richard P.
1879 Watson, Francis A. (L. F.)
1879 Woodbury, Charles H.
1879 Wirths, Maurice.
1879 Wolfe, Miss Catherine. (L. F.)
1880 Ward, Samuel. (L. F.)
1880 Williams, R., Jr.
1881 Wilson, James.
1881 Wilson, John.
1881 Whitehouse, Frederic C.
1882 Welch, Uriah.
1882 Watson, Frederick.
1882 Wadsworth, John H.
1882 Wheeler, Ezra.
1882 Willis, Benjamin A. (L. F.)
1882 Waddingham, Wilson. (L. F.)
1882 Williams, Francis W.
1882 Williams, John L.
1882 Willard, Daniel W.
1882 Williams, David. (L. F.)
1882 Winthrop, Robert. (L. F.)

1871 Youngs, Henry I.
1874 Young, Mason.
1879 Yates, Ellis Samuel.
1880 Young, William.

1875 Zollikoffer, Oscar.

FELLOWS DECEASED, 1882.

Carhart, Thomas F.
Cary, William F.
Constable, Maj. A. G.
De Peyster, Frederick.
Edwards, Jonathan.
Garrison, William R.
Graham, James L.
Hallock, Henry W.
Hawk, Samuel.
Howell, Maj. Charles W.
Kemp, William.
Perkins, George W.
Spencer, Mrs. Catherine L.
Stokes, James.
Stuart, Robert L.
Walker, Evan T.

CORRESPONDING MEMBERS, DECEASED, 1882.

Marsh, Hon. George P., LL.D. Schlagintweit-Sakünlünski, Robert von.
Newmarch, William.

List of Foreign and Domestic Geographical and other Scientific Bodies with which this Society is in Communication and Constant Exchange of Publications.

Academia Real das Sciencias, Lisbon, Portugal.
Academy of Natural Sciences, Philadelphia, Pa.
Academy of Natural Sciences, Davenport, Iowa.
Academy of Sciences, St. Louis, Mo.
Academy of Natural Sciences, Minneapolis, Minn.
American Antiquarian Society, Worcester, Mass.
American Naturalist, Salem, Mass.
American Social Science Association, Detroit, Mich.
Astor Library, New York.
Bibliotheca Nacional, Rio de Janeiro, Brazil.
Boston Society of Natural Sciences, Mass.
Bureau of Education, Washington, D. C.
Caucasian Section, Imperial Russian Geographical Society, Tiflis, Russia.
Central Bureau of Statistics, Stockholm, Sweden.
Charleston Library Society, Charleston, S. C.
Circolo Geografico Italiano, Turin, Italy.
Commissão Central Permanente de Geographia, Lisbon, Portugal.
Cornwall Library, Cornwall-on-the Hudson, N. Y.
Cosmos ; Guido Cora, Turin, Italy.
Essex Institute, Salem, Mass.
Etablissement Géographique de Bruxelles, Belgium.
Ferdinandeum in Innspruck, Austria.
Geographical Society of the Pacific, San Francisco, Cal.
Geographical Society, Lyons, France.
Geographical Society, Hamburg, Germany.
Geographical Society, Amsterdam, Holland.
Geographical Society, Marseilles, France.
Geographical Society, Munich, Germany.
Geographical Society, Dresden, Germany.
Geographical Society, Hermannstadt, Hungary.
Geographical Society, Hanover, Germany.
Geographical Society, Copenhagen, Denmark.
Geographical Society, Bremen, Germany.
Geographical Society, Madrid, Spain.
Geographical Society, Weimar, Germany.

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Geographical Society, Bombay, India.
Geographical Society, Quebec, Canada.
Geographical Society, Metz, Germany.
Geographische Anstalt, Gotha, Germany.
Geological Society, Edinburgh, Scotland.
Geological Survey, Ottawa, Canada.
Gesellschaft für Erdkunde zu Berlin, Prussia.
Gewerbeschule, Bistritz, Hungary,
Historical Society, Iowa City, Iowa.
Historical Society, Madison, Wis.
Hungarian Academy of Sciences, Pesth, Hungary.
Hydrographic Office, The Admiralty, London.
Imperial Russian Geographical Society, St. Petersburg.
Imperial Royal Academy of Sciences, Vienna.
Imperial Royal Geographical Society, Vienna.
Instituto Historico Geografico del Rio de la Plata, Buenos Aires.
Instituto Geografico Argentino, Buenos Aires.
Instituto Historico, Geographico, e Ethnographico do Brazil, Rio de Janeiro.
Institut Géographique International, Berne, Switzerland.
Kais. Königl. Geologische Reichsanstalt, Vienna.
Königl. Gesellschaft der Wissenschaften, Göttingen, Germany.
Königl-Sächs. Gesellschaft der Wissenschaften, Leipzig, Germany.
L'Exploration, Paris.
Library of Congress, Washington, D. C.
Library Department of State, Washington, D. C.
Literary and Philosophical Society, Liverpool.
Literary and Philosophical Society, Manchester, England.
Literary and Historical Society of Quebec, Canada.
Long Island Historical Society, Brooklyn, N. Y.
Melbourne Observatory, Melbourne, Australia.
Ministère de l'Agriculture, de l'Industrie, et du Commerce, Rome, Italy.
Museo Nacional de México, México.
Mexican Geographical and Statistical Society, Mexico.
Natural History and Philosophical Society, Belfast, Ireland.
Nature, London.
Naturforschende Gesellschaft, Emden, Germany.
Naval Institute, Annapolis, Md.
N. Y. State Museum of Natural History, Albany.
N. Y. State Library, Albany.
North-China Branch of the Royal Asiatic Society, Shanghai.
Philosophical Society, Wellington, New Zealand.
Polymathic Society, Vannes, France.
New York Academy of Sciences, New York.
New York Historical Society, New York.
Pulkowa Observatory, Pulkowa, Russia.

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Real Academia Española Arqueológica y Geográfica, Madrid, Spain.
Revue de Géographie, Paris.
Revue Géographique, 37 Rue Scheffer, Paris.
Roumanian Geographical Society, Bucharest.
Royal Geological Society, Dublin, Ireland.
Royal Society of Victoria, Melbourne, Australia.
Royal Danish Academy of Sciences, Copenhagen, Denmark.
Royal Geographical Society, London.
Royal Academy of Sciences, Munich, Germany.
Royal Society of Sciences, Upsala, Sweden.
Royal Prussian Statistical Bureau, Berlin.
Royal University, Christiania, Norway.
Royal Society, London.
Royal Cornwall Polytechnic Society, Cornwall, England.
Royal Academy of Sciences, Brussels, Belgium.
Royal Institute for Philology, Geography, and Ethnography of Dutch India, The Hague, Holland.
Royal Dutch Meteorological Institute, Utrecht, Holland.
Royal Hungarian University, Pesth, Hungary.
Royal Asiatic Society, London.
Section of the Imperial Russian Geographical Society, Orenburg.
Smithsonian Institution, Washington, D. C.
Sociedade de Geographia, Lisbon, Portugal.
Società Geografica Italiana, Rome.
Société de Géographie, Geneva, Switzerland.
Société de Géographie, Lille, France.
Société de Géographie, Toulouse, France.
Société de Géographie, Rochefort, France.
Société Belge de Géographie, Antwerp, Belgium.
Société de Géographie, Paris.
Société Khédiviale de Géographie, Cairo, Egypt.
Société Belge de Géographie, Belgium.
Société des Sciences Naturelles, Cherbourg, France.
Société de Géographie Commerciale, Bordeaux, France.
Société Normande de Géographie, Rouen, France.
Société de Géographie de Montpellier, France.
Société Suisse de Topographie, Geneva, Switzerland.
Society of Natural Sciences, Buffalo, N. Y.
State Library, Boston.
Statistical Society, London.
Statistisches Amt des Deutschen Reichs, Berlin.
The Academy, London.
The Asiatic Society, Yokohama, Japan.
The Japan Gazette, Yokohama, Japan.
U. S. Military Academy, West Point, N. Y.

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Poughkeepsie Society of Natural Science, Poughkeepsie, N. Y.
Tokio Geographical Society, Tokio, Japan.
U. S. Geological Survey, Washington, D. C.
United States Coast Survey, Washington, D. C.
Verein für Erdkunde, Darmstadt.
Verein für Geographie und Naturwissenschaften, Kiel, Germany.
Verein von Freunden der Erdkunde, Leipsig, Germany.
Victoria Institute, or Philosophical Society of Great Britain, London.
Zeitschrift für Geographie, Lahr, Baden, Germany.

ADDITIONS TO LIBRARY AND MAP-ROOM, 1882.

PURCHASES.

Nordenskiöld's Voyage of the Vega, 2 vols., London, 1881 ; Die Loango-Expedition, 1872–76, von Paul Güssfeldt, IIIte. Abth., Leipzig, 1882 ; The Necropolis of Ancon, Part VI., London and Berlin ; Egyptian Obelisks, by H. H. Gorringe, New York, 1882 ; History of Spain and Portugal, 5 vols., New York, 1872 ; Murray's Hand-Book for Travellers in Scotland, London, 1875 ; Grundzüge der Physischen Geographie des Meeres, E. Gelrich, Wien, 1881 ; Vlämischer Bericht über Vasco da Gama's Zweite Reise, 1502–1503, H. C. G. Stier, Braunschweig, 1881 ; History of the Bermudas, by Gen. Sir Henry Lefroy, London, 1882 ; The Life of Sir Martin Frobisher, Containing a Narrative of the Spanish Armada, by Rev. Frank Jones, B.A., London, 1878 ; Letters of a Traveller, by Wm. Cullen Bryant, New York, 1859 ; A Sketch of the Route to California, China, and Japan via the Isthmus of Panama, San Francisco, 1867 ; An Account of the Empire of Morocco, by James Grey Jackson, Philadelphia, 1810 ; Brazil and the Brazilians, by Rev. J. C. Fletcher and Rev. D. P. Kidder, Boston, 1879 ; On the Nature of Thunderstorms and on the Means of Protecting Buildings and Shipping, by W. Snow Harris, London, 1843 ; Epitome de la Bibliotheca Oriental y Occidental Náutica y Geográfica de Don Antonio de Leon Pinelo, 3 vols., Madrid, 1737–1738 ; Asher & Adams' New Commercial and Statistical Atlas of the United States, New York, 1872 ; Journeyings in Russia, by Thomas W. Knox, Hartford, 1877 ; Diccionario Geographico, Historico, e Descriptivo do Imperio do Brazil, 2 vols., Pariz, 1845 ; A Voyage into the Levant, by Henry Blount, London, 1638 ; A New System of Modern Geography, by Elijah

Parish, D.D., Newburyport, 1812; New York As It Was and As It Is, by J. Disturnell, New York, 1876; Among the Azores, by Lyman H. Weeks, Boston, 1882; Book of Summer Resorts, compiled by Charles H. Sweetser, New York, 1868; Sketches of Persia, from the Journals of a Traveller, Philadelphia, 1828; Elements of Geography, Benjamin Workman, Philadelphia, 1790; Memoirs of Stephen Burroughs, Vol. I., Albany, 1811; Map of Pennsylvania, New Jersey, and Delaware, Constructed from the Latest Authorities, Philadelphia, n. d.; Map of the State of Missouri and Territory of Arkansas, Philadelphia, 1831; La Geografia di Claudio Tolomeo Alessandrino, Nuovamente tradotta di Greco in Italiano da Girolamo Ruscelli, Venetia, 1561; Historia de las Indias, escrita por Fray Bartolomé de las Casas, por José Sancho Rayon, Madrid, 1875; Voyage fait par Ordre du Roi en 1750 et 1751, dans l'Amérique Septentrionale par M. de Chabert, Paris, 1753; The True History of the Conquest of Mexico, by Capt. Bernal Diaz del Castillo, Written 1568, Translated from the Original Spanish by Maurice Keatinge, London, 1800; Portugal Illustrated, by the Rev. W. M. Kingsley, London, 1828; The American Gazetteer, London, 1762; Narrative of a Voyage to the Spanish Main on the Ship "Two Friends," London, 1819; History and Geography of the Mississippi Valley, by Timothy Flint, Cincinnati, 1832; Relation of Alvar Nuñez Cabeça de Vaca, Translated by Buckingham Smith, New York, 1871; A Brief Description of New York, formerly New Netherlands, by Daniel Denton, New York, 1845; The Western Gazetteer, by Samuel Brown, Auburn, 1817; Gazetteer of the State of Michigan, by John T. Blois, Detroit, 1838; New York Colonial Tracts, 1–3, Albany, 1866; Le Relationi Universali di Gio. Botero Benese, Vicenza, 1514; Theatro de los Mayores Principes del Mundo de Juan Botero, por F. Jayme, Barcelona, 1605; The Complete Weather Guide, by Joseph Taylor, London, 1812; A Brief Description of the Whole World, by George Abbott, London, 1636; An Atlas of the State of New York by David H. Burr, New York, 1829.

GIFTS.

From Mr. Elial F. Hall:

Annual Report of Operations of the U. S. Life-Saving Service for 1878, Washington, 1878.

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From Mr. Edwin Vincent:

Wahrhaftige Beschreibungen dreyer mächtigen Königreiche Japan, Siam, und Corea, von Christoph Arnold, Nürnberg, 1672.

From the Department of State, Washington:

Reports of the U. S. Commissioners of the Paris Universal Exposition in 1878, 5 vols., Washington, 1880; Papers Relating to the Foreign Relations of the U. S., with Message of the President, Washington, 1882.

From the Department of Agriculture, Washington:

Report upon the Condition of Winter Grain, Washington, 1882; Florida: Its Climate, Soil, Productions, and Agricultural Capabilities, Washington, 1882; Climate, Soil, and Agricultural Capabilities of South Carolina and Georgia, Washington, 1882; Silos and Ensilage: A Record of Practical Tests in Several States and Canada, Washington, 1882; Report upon the Yield and Quality of Small Grain, the Condition of Corn, Cotton, Tobacco, etc., Washington, 1882.

From the Department of War, Washington:

Lecture on the Improvement of the Danube at Vienna, by Sir G. von Wex, translation, Washington, 1880; Analytical and Topical Index upon Works and Surveys for River and Harbor Improvement, 1866–1879, Washington, 1881; Report upon Experiments and Investigations to Develop a System of Submarine Mines for Defending the Harbors of the U. S., Washington, 1881; Report upon U. S. Geographical Surveys West of the 100th Meridian, Vol. III., Washington, 1881; Annual Report of the Chief Signal Officer for the Year 1879, Washington, 1880; Report on the Character of Six Hundred Tornadoes, by Sergeant J. P. Finlay, Washington, 1882; Signal-Service Tables of Rain-Fall and Temperature, by H. H. C. Dunwoody, Washington, 1882; Annual Report of the Chief Signal Officer for 1880, Washington, 1881.

From the Department of the Interior, Washington:

Circulars of Information of the Bureau of Education, 4 and 5, Washington, 1882; Statistics of the Iron and Steel Production of the U. S., Washington, 1881; History and Present Condition of the Fishery Industries, by Ernest Ingersoll, Washington, 1881; Production of the Precious Metals in the U. S., by Clarence King, Washington, 1881; List of Congressional Documents from the Twentieth

to the Forty-Sixth Congresses, Washington, 1882; Report on the Geology and Resources of the Black Hills of Dakota, by H. Newton and W. P. Pinney, Washington, 1880.

From the Department of the Treasury, Washington:

Report of the U. S. Coast and Geodetic Survey for 1878, Washington, 1881.

From the Department of the Navy, Washington:

Instructions for Observing the Transit of Venus, December 6, 1882, Washington, 1882.

From the Hydrographic Office, Washington:

Chart of the Harbor of Havana from the most Recent Spanish Surveys to 1879; Circumpolar Chart from the Latest Authorities to 1882; Chart of the Harbors of Jamaica from British Surveys to 1879; Chart of Jamaica from British Surveys from 1873 to 1881; Chart of the Arctic Sea from Wrangel Island to Mackenzie River; Chart of the Amazon River, from Pará to Manaos, from a Survey by the Officers of the U. S. S. Enterprise, under Comm. Selfridge, 1878–80; Circumpolar Chart in Two Sheets: (Sheet 1), Arctic Sea North of the Pacific Ocean, from the Latest Authorities in 1882; Chart of the Arctic Ocean between Greenland and Nova Zembla, from Swedish, Danish, British, Russian, and German Surveys up to 1871.

From the Chief of Engineers, U. S. A., Washington:

Annual Report of the Chief of Engineers for the Year 1881, Washington, 1881; Map Showing the Locations of Works and Surveys for River and Harbor Improvement, 1879; Map of the Department of the Columbia, 1881.

From the U. S. Coast and Geodetic Survey, Washington:

Methods and Results: An Attempt to Solve the Problem of the First Landing of Columbus in the New World, by G. V. Fox, Washington, 1882; Methods and Results: An Enquiry into the Variation of the Compass off the Bahama Islands at the Time of the Landfall of Columbus in 1492; Appendix No. 19—Report for 1880, Washington, 1882.

From the Post Office Department, Washington:

Post-Route Maps: Pennsylvania, New Jersey, Delaware, and Maryland, 1869; Louisiana, 1880; New York, 1868; Mississippi River, from St. Louis to Mouth, 1882; Kentucky and Tennessee,

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1878; Virginia and W. Virginia, 1882; Illinois, Iowa, and Missouri. 1872; Kansas and Nebraska, 1875; Florida, 1876; Alabama and Mississippi, 1876, South Carolina and Georgia, 1879; Colorado, 1877; Oregon and Washington, 1882; Utah, 1882; Arkansas and Indian Territory, 1879; Texas, 1878; New Mexico and Arizona, 1881; Michigan and Wisconsin, 1872; New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, 1866; Minnesota, 1876; Montana, Idaho, and Wyoming, 1882; Dakota Territory, 1879.

From Gen. Geo. W. Cullum:

First Treatise on the Decrease of Water in Springs, Creeks, and Rivers, by G. Wex (Translated), Washington, 1881; Letter from Hon. W. W. Corcoran on the Washington Monument, Washington, 1881; Report of Lieut.-Gen. P. H. Sheridan of his Explorations through the Big Horn Mountains, Washington, 1882; Letters from the Secretary of War, Washington, 1881 and '82; Annual Report of the Adjutant-General of the State of New York, 1881; Inspection of the Improvement of South Pass, Mississippi River, 1881; Seat of War in Asia, Map of Afghanistan, Published in the Office of the Chief of Engineers, 1878; Map Showing Locations of Works and Surveys for River and Harbor Improvement, 1879; Annual Report of the Chief of Engineers, 1881; Report of the U. S. Board Appointed to Test Iron, Steel, and Other Metals, Vol. 2, 1881; Explication du Zodiaque de Denderah, des Pyramides et de la Génése, par Capt. Justin Roblin, Caen, 1861; Le Lac Moeris, par M. Frédéric Cope Whitehouse, Paris, 1882; Testimony before the Select Committee of the Senate Appointed to Investigate the Potomac River Front of Washington, Washington, 1882; Progress Report of the Mississippi River Commission, 1881; Extracts from Opinions of the Attorney-General of the U. S., Acquisitions of Lands, Contracts, etc., Compiled by J. G. Parke, Lieut.-Col. of Engineers, Washington, 1882; Extracts from Reports of Decisions of the Supreme Court of the U. S. on Navigation, Waters, etc., Compiled by J. G. Parke, Lieut.-Col. of Engineers, Washington, 1882.

From the Smithsonian Institution:

Report for 1880, Washington, 1881; First Annual Report of the Bureau of Ethnology, by J. W. Powell, Washington, 1881.

From Hon. Charles P. Daly:

Catechism in the Mik-Mak Language, Vienna, 1866; Terzo Con-

gresso Geografico Internazionale, Catalogo Generale, Venezia, 1881 ; Recherches relatives à l'Influence de la chaleur solaire, Paris, 1881 ; Études sur l'amplitude diurne de la Température, Moscow, 1881 ; Inter-oceanic Canal Projects, by A. G. Menocal, 1879 ; Observations in Relation to a Communication between the Atlantic and Pacific Oceans, by Señor Gaetano Moro, New York, 1849 ; The Bermuda Islands ; Gletscher und Eiszeiten in ihrem Verhältnisse zum Clima, Berlin, 1881 ; Appareils hydrographiques exposés au Congrès Géographique de Venise, 1881 ; Fourth, Fifth, and Sixth Annual Reports of the Board of Health, New York, 1874–5 ; Report of Special Committee on Inter-oceanic Canal, "The Key of the Pacific," San Francisco, 1880 ; Theatro del Mondo di Abraamo Ortilio, Venetia, 1655 ; Twenty-fourth Annual Report on New York State Museum of Natural History, Albany, 1872 ; Cruise of the School-Ship "Mercury," 1870–1871, New York, 1871 ; Catalogue of Objects Exhibited from America, Venice ; Register of the Officers of the U. S. Military Academy from 1802 to 1850, compiled by Capt. G. W. Cullum, U. S. A., New York, 1850 ; Official Army Register, 1861–1867 ; The Domain of Physiology, by Sterry Hunt, Boston, 1882 ; L'Association Internationale Africaine, et le Comité d'Études du Haut-Congo, Bruxelles, 1882 ; Guide to Dakota and the Black Hills, Chicago ; Are the Southern Privateersmen Pirates ? by Charles P. Daly, New York, 1862 ; The Chinchona Forests of South America, Henry S. Wellcome, 1880 ; Sketch of Heinrich W. Dove, by F. Hoffmann, 1879 ; Biardo's Missio Canadensis, Albaniae, 1870 ; Lallemant's Letters, 1625 and 1626.

From the Italian Government :

Movimento della Navigazione nei Porti del Regno, Roma, 1881 ; Giornale del Genio Civile, Roma, 1881 ; Elenco dei Premi aggiudicati agli Espositori dal Giuri Internazionale, Roma, 1882 ; Elenco delle Questioni presentate al Terzo Congresso Geografico Internazionale, Roma, 1881 ; Annali di Statistica, Roma, 1882 ; Statistique Internat. des Banques d' Emission, Grande-Bretagne, Rome, 1882.

From the German Government :

Monatshefte zur Statistik des Deutschen Reichs für das Jahr 1882, Berlin ; Statistics of the Grand Duchy of Hesse, Darmstadt, 1882.

From the American Association for the Advancement of Science :

The Anthracite Coal Fields of Pennsylvania and their Exhaustion, by P. A. Schaefer, Harrisburg, 1881.

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From the Swedish Government :

Statistical reports for 1880 and 1881, 6 vols., 4°.

From Don Matias Romero, Minister of Mexico at Washington :

Nuevo Guia de México, arreglado por Ireneo Paz y Manuel Tornel, Mexico, 1882.

From Mr. F. E. Prime :

Kitchen's General Atlas, London, 1782 ; Old Atlas of the World (no date) ; Old American Atlas (n. d.) ; Collection of American Maps (in 1 vol.), by I. Russell, 1793–1800 ; Ortelius' Atlas.

From Mr. Thomas C. Acton :

Annual Report, Secretary of the Treasury, 1881.

From the Mexican Government :

Anales del Ministerio de Fomento de la Republica Mexicana, Mexico, 1882.

From the City of Bremen :

Jahrbuch für Bremische Statistik, Bremen, 1882.

From the City of Frankfort :

Civilstand der Stadt Frankfurt a. m., 1881, Frankfurt a. m., 1882.

From Mr. Chandler Robbins :

Annual Reports of the Yorkshire Philosophical Society for 1826–1856, 54 vols.

From the Prussian Statistical Bureau :

Jahrbuch, Berlin, 1881.

From the Norwegian Statistical Bureau :

Annuaire Statistique, 1879, Christiania.

From the Inspectorate General of Maritime Customs, China :

Medical Reports and Lists of the Lighthouses, Shanghai, 1882.

From August Meulemans (Author) :

Le Troisième Congrès International des Sciences Géographiques à Venise, Paris, 1882.

From Henry B. Hammond :

Rand, McNally, & Co.'s Indexed Atlas of the World, Chicago, 1882.

From Sidney F. Shelbourne (Author) :

Inter-oceanic Ship Canal—San Blas Route, New York, 1880 ; A Comparative View of the Panama and San Blas Routes for an Inter-oceanic Canal, New York, 1880.

From Heinrich W Klutschak (Author) :

Als Eskimo unter den Eskimos, Wien, 1881.

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From H. Habenicht (Author) :

Einige Gedanken über die hauptsächlichsten recenten Veränderungen der Erdoberfläche, Gotha, 1882.

From R. Blanchard Wheaton, (Author) :

Abraham Lincoln.

From the Hydrographic Office, Santiago, Chile :

Anuario Hidrográfico de la Marina de Chile, Santiago, 1881.

From the Imperial Observatory, Rio de Janeiro :

Bulletin Astronomique et Météorologique de l' Observatoire Impérial, Rio de Janeiro, 1881 ; Instrucções para as Commissões Brazileiras que têm de observar a Passagem de Venus em 5–6 de Dezembro de 1882, organisadas por L. Cruls, Rio de Janeiro, 1882.

From the U. S. Naval Observatory :

Astronomical and Meteorological Observations made during 1877, Washington, 1881.

From the Canadian Government :

Report of the Geological Survey for 1879–80.

From the State Geologist of New Jersey :

Annual Report for 1881. A Topographical Map of a Part of Northern New Jersey, by G. W. Howell and C. C. Vermeule, 1882.

From Lieut. G. M. Wheeler :

Report on U. S. Geographical Surveys W. of the 100th Meridian, vol. vii., Washington, 1879.

From Mr. John H. Latrobe (Author) :

The Capitol and Washington at the Beginning of the Present Century, 1881.

From the U. S. Naval Academy :

Catalogue of specimens added to the Cabinet, Washington, 1881.

From the Egyptian Government :

Décret, Règlement, etc., au Recensement général de la Population de l' Egypte du 3 mai, 1882, Le Caire.

PART I.

TRANSACTIONS

OF THE

SOCIETY FOR THE YEAR 1882.

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TRANSACTIONS OF THE SOCIETY FOR 1882.

Annual meeting of the American Geographical Society, held at Chickering Hall, Tuesday, Jan. 10, 1882, at 8 o'clock P.M.

Vice-President Gen. GEO. W. CULLUM, in the chair.

The reading of the minutes of the previous meeting was, on motion, dispensed with.

The following gentlemen were elected Fellows of the Society:

William Parsons (L. F.), Wendell Goodwin, Col. G. L. Gillespie, Wm. Barclay Parsons, Dr. Montrose A. Pallen, Jacob F. Bamberger, Wilbur Dixon Ellis, Herman Oelrichs, Dr. Louis F. Sass, Nelson S. Easton, Walter D. Edmonds, Granville Nicholson, E. Rhinehart.

The annual report of the treasurer, Mr. George Cabot Ward, was read, showing a cash balance for the general fund of $822.88, and the amount to the credit of the permanent fund $12,352.57. The report was accepted and ordered to be placed on file.

The annual report of the Council was then presented and read, as follows:

New York, January 7, 1882. The Council of the American Geographical Society submits the following report:

Since the last annual report seven meetings of the Society and eleven meetings of the Council have been held. On the 11th of January, 1881, Commander John R. Bartlett, U. S. Navy, read a paper on "The Recent Investigations of the Gulf Stream by the U. S. Coast and Geodetic steamer Blake."

On Jan. 25, 1881, Gen. G. W. Cullum, U. S. Army, Vice-President of the Society, read a paper "On the Land of Egypt."

On Feb. 17, 1881, Mr. John Banvard read a paper on the "Hierology and Reading of the Obelisks of Egypt,"

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On March 25, 1881, Commander Henry H. Gorringe, U. S. Navy, read a paper entitled "A Cruise along the Northern Coast of Africa."

On May 10, 1881, Mr. James Douglas, Jr., read a paper on "Chili: Its Geography, People, and Institutions."

On Nov. 25, 1881, Dr. Isaac I. Hayes delivered a lecture on "The Water-Ways of New York."

On Dec. 21, 1881, Rev. William Elliot Griffis delivered a lecture on "Corea, the Hermit Nation."

All the lectures but one were illustrated by stereopticon views.

The annual report of the treasurer, Mr. George Cabot Ward, shows a cash balance for the general fund of $822.88, and that the permanent fund is $12,352.57.

Seventy-seven Fellows have been elected and qualified during the year, and twelve have become Life Fellows by the payment of $100 each.

One Corresponding member has been elected.

The publications of the Society have been regularly distributed to the Fellows and also to 121 geographical and other scientific bodies of Europe and America with which this Society is in correspondence and exchange.

The additions to the library and its map-room have amounted to 1,038 items, of which 403 are books, 578 pamphlets, 52 maps, and 5 atlases.

In conclusion the Council congratulates the Fellows on the very prosperous condition of the Society.

Respectfully submitted,

(Signed) WILLIAM REMSEN,
Chairman of Council.

The Committee on Nominations appointed Dec. 21, 1881, to select candidates to fill vacancies, presented its report as follows:

The Nominating Committee appointed to select officers to fill vacancies, under resolution of the Society passed at the meeting of Dec. 21, 1881, respectfully report the selection of the following nominees for election:

For President—Charles P. Daly.

For Vice-President—George W. Cullum.

For Foreign Corresponding Secretary—J. Carson Brevoort.
For Treasurer—George Cabot Ward.
For Councillors—W. H. H. Moore, Isaac Bernheimer, Paul B. Du Chaillu, Charles H. Baldwin, D. O. Mills.

(Signed) DAVID P. HOLTON, *Chairman.*
THOMAS ADDIS EMMET,
DAVID S. BANKS,
Nominating Committee.

On motion the report was accepted and, a ballot being had, the nominees were unanimously elected.

Gen. George W. Cullum then read a most interesting paper, entitled, "The Acropolis of Athens."

The thanks of the Society were voted to Gen. Cullum, and a copy of his paper was requested for publication.

On motion the meeting adjourned.

Meeting of February 24th, held at Chickering Hall.

Vice-President GEO. W. CULLUM in the chair.

The reading of the minutes of the previous meeting was, on motion, dispensed with.

The following gentlemen were elected Fellows of the Society—Spencer D. Schuyler (L. F.), William H. Osborn (L. F.), George H. Dunham, Wm. B. Cooper, Jr. ; James C. Parish, Joseph H. Parsons, Austin D. Middleton, James H. Percival, James D. Ray, Frank S. Belton, Wm. Conger Pell, Caleb P. Marsh, John L. Nisbet, Ulysses D. Eddy, James M. Dunbar, Abraham L. Earle, Samuel Parsons, Rev. Mylton Mury, S. H. Robbins T. J. O. Rhinelander, Charles, H. Fellows, John Jasper, Jr., Dr. H. F. Quackenbos, George H. Brouwer, Robert Dunlap (L.F.), S. C. Gallaher, C. Lawrence Perkins, John P. Marquand, Leland Fairbanks, Jr., Richard H. Dodge, Joseph Naylor, Wm. G. Read, Ed. L. Oppenheim, William Calhoun, John McWilliam.

Gen. Cullum then read a series of resolutions, which had been approved by the Council, advocating the selection of a prime meridian, and suggesting that a special International Commission should meet at Washington to consider the subject. In introducing these resolutions Gen. Cullum said :

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The importance of the selection of a definite prime meridian has long been felt. The use of different meridians by different countries has caused much confusion. To obviate this difficulty, geographers have often brought before the different governments the necessity of concerted action, but such action has never been taken. It is now proposed that the meridian of 180 degrees from Greenwich should be taken as the prime meridian.

This meridian would pass near Behring Strait, and would thus allay the prejudices of all countries. In connection with this is the question of standard time. It is proposed that starting from the prime meridian, there should be standard meridians, and each of these should have its own time.

These meridians, twenty-four in all, might be designated by the letters of the alphabet. The plan of having a standard time is adopted by England and Italy, and in some cases it varies as much as twenty minutes from the true time.

By the method proposed, there would never be a variation of over thirty minutes. The hours should also be numbered from 1 to 24, instead of in a double series of 12.

On motion of Judge Peabody, Chief Justice Charles P. Daly, Gen. G. W. Cullum, Horatio G. Wright, W. B. Hazen, and Benjamin Alvord were appointed a committee to present to the government the views of the Society on this subject, in accordance with the resolutions of the Council, read by Gen. Cullum.

Gen. Cullum then introduced to the meeting Mr. George Kennan, who delivered an interesting address on "Siberia, the Exiles' Abode, and the Sufferings of the Survivors of the Jeannette."

At the conclusion of the address, Prof. Theodore W. Dwight moved a vote of thanks to the lecturer, which was unanimously passed.

Remarks were made by Judge Peabody and Chief-Justice Daly, and the meeting then, on motion, adjourned.

Meeting of March 21, 1882, held at Chickering Hall.

Vice-President G. W. CULLUM in the chair.

The reading of the minutes of the last meeting was, on motion, dispensed with.

The following gentlemen were elected Fellows :

Lewis A. Sayre, M.D. (L. F.), Edward N. Tailer (L. F), Wilson Waddingham (L. F.), Uriah Welch, C. H. McKnight, Wm. H. Osgood, Felix Samson, Eugene Thomson, John H. Wadsworth, John T. Terry, William Q. Riddle, Thomas C. Platt, John E. Parsons, Samuel Raynor, Nicholas Rath, George S. Scott, Henry M. Taber (L. F.), Benj. A. Willis (L. F.), M. M. Vail, Leicester P. Holme, Frederick Watson, Peter C. Schuyler, H. K. Thurber, Richard M. Raven, W. E. Redding, Archibald W. Speir, John Paton, Walton J. Peck, Charles Parsons, Ezra Wheeler, W. T. Moore, Edward Lambert, Woodbury Langdon, Lansing Lamont, Richard Nelson, Erastus F. Mead.

Felix A. Mathews, U. S. Consul-General for Morocco, and Horatio J. Sprague, U. S. Consul at Gibraltar, were elected Corresponding members.

Gen. Cullum then introduced the speaker of the evening, Gen. R. E. Colston, (late of the Egyptian Army), who delivered a lecture on, "Modern Egypt and Its People."

The large audience listened with marked attention, and a vote of thanks, moved and seconded, was unanimously passed to Gen. Colston.

On motion, the meeting adjourned.

Meeting of April 13, 1882, held at Chickering Hall, Vice-President G. W. CULLUM in the chair.

The reading of the minutes of the previous meeting was, on motion, dispensed with.

The following gentlemen were elected Fellows of the Society :

Giles E. Taintor, Charles M. Peck, Francis H. Markoe, James B. Olney, Charles H. Phillips, Samuel M. Mills, Wm. F. Ladd, Thomas M. North, Theo. F. Hascall, Herman L. Le Roy, Wm. L. Skidmore, Francis W. Williams.

Gen. Cullum, then introduced the speaker of the evening, President Daly, who gave a very interesting address on, "Spain, the Straits of Gibraltar and Tangier in 1881." Judge Daly said he had selected Spain as a country unlike any other in Europe and espe-

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cially interesting to Americans, because it was the motherland of Central and South America. He thought that the Spaniards were much misunderstood and very often misrepresented by travellers, to whom they were nevertheless uniformly courteous and kindly. He had found them an independent and spirited people.

The thanks of the Society were voted to Judge Daly and the meeting, on motion, adjourned.

Meeting of November 17, 1882, held at Chickering Hall.

Chief-Justice DALY, President, in the chair.

On motion, it was voted to dispense with the reading of the minutes of the previous meeting.

The following gentlemen were elected Fellows of the Society :

Lewis H. Lapham, William E. Gilbert, Charles G. Otis, George Gordon King, Rev. J. R. Paxton, Thos. McElrath, Octavius D. Baldwin, Franklin W. Campbell, Francis M. Bacon, John L. Williams, George H. Babcock, Samuel F. Barger, J. Pierrepont Edwards, Charles B. Reynolds, William S. Hawk, Daniel W. Willard, Simon W. Sibley, Wm. P. St. John, Le Roy King, Dr. L. T. Sheffield, Banger Clarkson, Albert Gallup, Gustave N. Ballin, Hugh W. Adams, James I. Higginson, John S. King, Roswell G. Rolston, August H. Edinger, Newcomb C. Barney, Thos. J. Falls, Jr., Jno. W. Emerson.

Frank Vincent, Jr., was elected a Corresponding member of the Society.

President Daly then introduced to the Society Mr. Paul B. Du Chaillu, who gave an interesting account of his recent journeys in Norway, Sweden, Lapland, and Northern Finland. The lecture was illustrated by stereopticon views.

The Society passed a vote of thanks to the lecturer and, on motion, the meeting adjourned.

Meeting (Special) of Dec. 4, 1882, held at the rooms of the Society, 11 W. 29th st.

Chief-Justice Daly introduced the subject of the evening : "The Portraits of Columbus." It was curious, he said, that so much un-

certainty prevailed as to the facts in the life of one of the most distinguished men who ever lived.

The date of his birth was not settled and 23 localities dispute the honor of having given him birth. His son Fernando described him as blue-eyed and fair-haired, with an aquiline nose ; and adds that his hair turned white at the age of thirty.

Oviedo, who knew him, says that he was above the medium height, of powerful frame, and red-haired. His manner in speaking was gentle. Of the portraits displayed before the meeting, Judge Daly gave the preference to the original of the engraving in Paulus Jovius ; and after this, in order, he classed the original of the engraving published by Capriola, the picture in the Bibliographical Manual of Madrid, and the picture in the Naval Museum at Madrid ; of which last a copy was shown. The portrait at Albany, highly prized as it was, was wholly apocryphal. Mr. Nestor Ponce de Leon then read a paper, which classified under 30 general types the 200 portraits of Columbus which he had examined. He agreed with Judge Daly in his selection of the most faithful pictures. After remarks made by other members of the Society the meeting, on motion, adjourned.

Meeting of Dec. 18, 1882, held at Chickering Hall.

Chief-Justice DALY, President, took the chair.

It was voted, on motion, to dispense with the reading of the minutes of the previous meeting.

The following gentlemen were elected Fellows of the Society :

David Williams (L. F.), Mr. Edwin Parsons (L. F.), John T. Ijams, J. Grahame Gardiner, F. R. Coudert, Fredk. P. Garrettson, Henry W. Jenkins, Joseph P. Earle, Dr. W. E. Hoag, William Viall Chapin, H. G. Peterson, Roscoe K. Ingalls, Vincent C. King (L. F.), Robert Winthrop (L. F.), John Emmons, Fredk. W. Gade, Charles Scribner, Charles Rhinelander, H. T. Imbrie, Rev. N. W. Conkling, C. L. Rathborne. Rev. Marvin R. Vincent, W. R. Morgan, Jr., Robt. H. Lamborn.

Lieut. J. W. Danenhower was elected a Corresponding member.

President Daly then introduced the speaker of the evening, the Hon. A. D. White, late U. S. Minister to Germany, who delivered

an elaborate address on the constitution, development, and condition of the German empire. The thanks of the Society were voted to Mr. White, and, on motion, the President then appointed the following gentlemen a Nominating Committee to select candidates for the ensuing year, to report at the annual meeting in January: Oliver P. Hubbard, Chairman, James O. Wilson, and John McMullen.

On motion, the meeting adjourned.

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PART II.

PAPERS READ

BEFORE

THE SOCIETY DURING 1882.

Note.—The Authors alone are Responsible for the Contents of their Respective Papers.

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THE ACROPOLIS
ATHENS

THE ACROPOLIS OF ATHENS.

BY

GENERAL GEORGE W. CULLUM, U. S. ARMY,
Vice-President of the Society.

On a bright May morning, thirty years since, after a long tour of African and Asiatic travel, I arrived at the Piræus, the port of Athens, to which, till about 86 B. C., it was connected by two defensible parallel walls over a quarter of a mile apart, which were sixty feet high and five miles long. Landing at the custom-house, I put my hand in my pocket to pay the usual backseesh for the quiet disposal of my luggage, when I heard the official called "Aristides." Of course I felt rebuked in the presence of one named "the Just;" therefore, instead of money I politely extended the key of my trunk. Will you believe it! Aristides shook his head, whispered "two drachmas" into my astonished ear, and unabashed received the silver wages of Eastern iniquity; but justice was satisfied, and I and my trunk were on our winding way to classic Athens in a most unclassic omnibus! Ye gods! is it to be credited that my boatman was named Themistocles, my driver Pericles, and the porter Miltiades—all with the noble presence, erect statures and dignified movement of their ancestral progenitors! After refreshing ourselves at the hotel of Polycronopolis, who my fellow-traveller would always call hippopotamus (forgetting that was the Greek for sea-horse), we sallied out to see the sights, for I remembered the saying of Lysippus:

> "Hast Athens seen not? Thou art a log.
> Hast seen and not been caught? Thou art an ass."

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Soon I escaped both imputations, for all day, from sun to sun, I wandered through a continuous gallery of the world's most wondrous history, and that night laid my head upon my pillow in a delirium of delight to dream of the land

> "Where grew the arts of war and peace,
> Where Delos rose, and Phœbus sprung."

She who had had a brilliant life of a thousand years was still Greece, "but living Greece no more." She, once mistress of the world, like Babylon, Persia, Syria and Egypt, had death written upon her frontlets. All alike had obeyed the same law of development and dissolution. But, though the power of empire has vanished, the glorious memories of Greece will survive forever; for here were laid the fast foundations of civil society; here poetry had its highest inspiration and most favoring auspices; here eloquence had its noblest aims and greatest intellectual force; here the writing of history began its career and reached its highest perfection; here was the cradle of the physical sciences; here expanded the philosophy of the mind; here ethical culture taught the true relations of man to his fellow and to the Supreme Ruler of the Universe; here education developed every faculty of mind and body in harmonious proportions; and here Art was the handmaid of Religion, fashioning the plastic ideal of the god and rearing the fit temple for its worship.

This art attainment, with which we are now concerned, was doubtless the offspring of the stupendous works of Egypt; but the grandeur of immensity of temples and palaces, and the solemn repose of giant statues of heroes and gods, which typified the architecture of the Nile, had little of that spirit of grace and symmetrical proportion in

which the apt and æsthetic scholar far surpassed his mighty master. From the sublime has come the beautiful; the sombre sandstones and gloomy granites of Egypt have yielded to the brilliant crystalline marbles of Paros and Pentilicus; the columns of Nilitic reeds have developed into Doric shafts; the pillars of grave Isis have been given to sprightly Io to be transformed into the more perfect Ionic order; and stiff palm-leaf capitals have developed into the feathery foliage of acanthus plumes now crowning the graceful Corinthian.

After Cambyses' invasion Egypt became a Persian province, and the same fate was impending over Greece, when the vast incursion of Darius was stayed by the glorious and world-renowned victory of Marathon, followed a little later by the defeat of Xerxes at Salamis and Platea. In the great struggle the City of Athens was destroyed; but her people, unappalled by the successive waves of Oriental despotism, continued to maintain the foremost rank in civilization, and, so soon as the storm had swept by, art and literature resumed their sway. Attica's capital rose again, and on her ashes were created those masterpieces of architecture and sculpture which have won the admiration of all succeeding ages. Fortunately for the world, this was the illustrious fifth century, before Christ, of Grecian renown, in which flourished the greatest of poets—Pindar, Sophocles and Euripides; of historians—Herodotus, Thucydides and Xenophon; of orators—Æschines and Demosthenes; of philosophers—Socrates and Plato; of artists—Zeuxis and Phidias; of warriors—Themistocles, Miltiades, Cimon and Pausanias; and of statesmen—Aristides and Pericles. This last, the greatest man of this greatest age, was not only a statesman, but distinguished himself as an orator and phi-

losopher; commanded as a general; became the patriotic head of Attica; ruled his people with wisdom and justice; was the soul of every enterprise; and exalted Athens to the highest pinnacle of power and glory. Nobly born, the fullness of beauty and mould of form, splendidly endowed with æsthetic tastes and intellectual gifts, educated by the ablest masters in all learning and accomplishments, gifted with graceful manners and a musical tongue, and possessed of subtle sagacity and the great attributes which command success, Pericles became both the leader and idol of his people. Entering on public life in the maturity of his powers, by wisdom and transcendent genius he governed Attica forty years; elevated her to the acknowledged leadership of the Hellenic States; and made Athens the brilliant capital of Greece, the focus of elegance in art, the centre of civilization, and the cynosure of the refinement, erudition and magnificence of the whole world.

One of the noblest conceptions of this foremost man of his age, when entering upon his public career, was the rebuilding of the temples left in ruins by the Persian invasion. From the overflowing treasury, acquired from vanquished Persia, what Pericles asked was promptly voted; and the Propylæa, the Parthenon, and the Erechtheium, soon rose in beauty, while was elevated the colossal bronze statue of Athene, spear in hand, looking down upon the city of which she was the protecting goddess.

Athens, by a happy coincidence, then held another genius —Phidias, who, with high intellectual sentiment, fiery imagination, bold delineation, and unrivalled skill in plastic art, united rapidity of execution to exquisite finish. This Michael Angelo of Greece coöperated with Pericles in carrying out his magnificent plans of adorning the Acropolis.

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Though these creations of the almost inspired designer have suffered much from the ravages of war and earthquakes, the spoliation of Turks and plundering of Englishmen, they, in ruins, still continue to be the stateliest, the most interesting and, in many respects, the most perfect architectural remains in the world.

The ACROPOLIS, a citadel as well as a great sanctuary, on a low hill rising one hundred and fifty feet above the Athenian plain, was fortified along the crest of the celebrated Cecropian rock by a wall a mile and a third in circuit. On its western side, the PROPYLÆA, forming its splendid frontispiece, served both as an architectural embellishment to this temple-adorned hill and as a military defense to its grand portal. The boldness and originality of its design, the magnificence of its general effect, and the skill with which the inequalities of its site were overcome, caused it to be admired by the ancients even more than the renowned Parthenon. The approach, seventy feet broad, was by sixty marble steps, now mostly in ruins. At the summit of the flight was a portico of six fluted Doric columns, five feet in diameter and twenty-nine in height, surmounted by an entablature and pediment. Attached to each side of this porch were projecting wings, seventy-eight feet apart, having three Doric columns on either hand flanking the grand staircase. The north wing, thirty-five feet by thirty, contained the Pinacotheca ; and the south wing was a smaller hall, twenty-seven feet by sixteen. Behind the Doric hexastyle of the Propylæa was a magnificent hall, fifty-eight feet broad, forty-four feet deep, and thirty-nine feet high, having a richly painted marble ceiling resting on enormous stone lintels, which were supported by three graceful Ionic columns on each side of the central passage. At the

east end of this hall was the citadel wall, in which were one grand and four small bronze gates, the main one being specially appropriated to the entrance of the Panathenaic procession. Within the wall, on the eastern side, was another hall or posticum, nineteen feet deep and terminated by another Doric portico of six columns, with its entablature and pediment. This noble structure, where the Doric and Ionic styles harmoniously blended in graceful proportions, with its rich ceilings exquisitely decorated with gold and colors, is still beautiful in ruins, many of its columns being yet entire.

To the right of the Acropolis entrance and exterior to the fortification wall, was the little "WINGLESS TEMPLE OF VICTORY," on the rocky declivity from whence Ægeus is said to have thrown himself headlong. This very small structure, not over twenty feet long, consists of two porticos, each of four fluted Ionic columns, connected by a cella of solid masonry. It was built after the Persian invasion, and is called "wingless" to express the hope that victory might never take flight from Athens. This elegant temple of Niké Apteros was, seemingly, a graceful lodge to the glorious edifices within the enclosing wall of the Acropolis.

Passing through the Propylæa, we find, on the left or northern side of the Acropolis, the exquisite and unique little temple in the Attic-Ionic style, called the ERECHTHEIUM, or rather the two temples of Polias and of Pandrosus joined together in the form of the letter ┳, resembling a nave with a transept at one extremity. This nave, or main building, was a cella thirty-seven feet broad and seventy-three feet long from west to east, the latter extremity being terminated with a splendid porch of six Ionic columns. The

lesser part, or irregular transept, at the western end of the cella, was of three unequal widths. The widest, or northern part of this latter, was adorned with a stately and magnificent porch of six Ionic columns, of which four were on the northern front and one on each of the eastern and western sides. Six half engaged pillars ornamented the western front of the next broadest or central part ; and the narrowest, or south part of the transept, was enriched with six Caryatides, or delicate statues of Athenian maidens beautifully draped, all of which rested upon a high parapet wall and supported on their heads the elegent Ionic roof of the southern porch. This most finished and pleasing of all the Ionic structures of Greece, though far less grand than the colossal temple of Ephesus, was rebuilt after the Persian destruction and comprised many shrines, in which were statues of goddesses and tombs of heroes. It became the most sacred of all the Athenian sanctuaries, and, with its chaste classic elegance and rich luxuriance of decoration, is to every artistic beholder a gem of beauty and a joy forever.

On the right, or southern side of the Acropolis, stands the famous PARTHENON (Virgin's House), the highest conception of architectural genius and the most magnificent structure which has ever stood upon the face of the earth. This peerless edifice, built of pure Pentelic marble, by Ictinus and Callicrates, under the superintendence of Phidias, crowned the summit of the Acropolis, the finest site in the world. On a base, approached on all sides by three steps, this masterpiece of art stood 228 feet in length, 102 in breadth, and rose 64 feet above the platform, producing an impression of grandeur and sublimity. The body of the building was divided into two unequal apartments, the *proanos* at the western end being 44 feet long, and the *naos* at the eastern 98 feet in length, the ceiling of the former

being supported by four and the latter by twenty-three columns. The whole was surrounded by a peristyle of forty-six fluted Doric columns, of which eight were in each of the fronts and fifteen (exclusive of those at the angles) on each side, all thirty-four feet high and over six in diameter at the base ; and within the peristyle, at each end, on a stylobate of two steps, were six other columns of smaller dimensions. Surmounting the peristyle was the entablature which supported the marble roof, open in the centre to admit light and air. The sculptures, executed by Phidias himself, were, on the eastern pediment the birth of Athene, and on the western her contest with Poseidon for the possession of Attica ; on the ninety-two metopes of the outer frieze were the combats of Hercules and Theseus and the Centaurs and Amazons, in life-size alto-relevos ; and within the peristyle an unbroken frieze of masterly half-size bas-reliefs, extending 520 feet round the cella, represented the great ceremonial procession at the Panathenaic festival. In the western chamber of the temple was the celebrated colossal statue, thirty-five feet in height, of Athene—a core of wood covered with plates of gold and polished ivory, with eyes of precious stones. These exquisite sculptures, which so gracefully and lavishly adorned this paragon of temples and made the marble almost speak, were but a part of its wondrous beauty of execution. Though horizontal and vertical lines apparently dominated the whole structure, not a single straight line was to be found anywhere, all being conic curves with slight deflections, thus to produce by their combination the effect of perfect regularity and harmony. Even the spaces of the intercolumination and the size of the capitals slightly varied according to position. Besides, there is little doubt that the painter's pencil beautified many a moulding, by

delicate tints enlivened broad surfaces, and with more sombre hues produced agreeable lights and shades. Material ends were everywhere subordinated to spiritual conceptions and æsthetic perfection.

This glorious temple of temples, in material, design and decoration, the most perfect ever executed, was completed 438 B. C., under the administration of the great Pericles; was beautified and repaired in the reign of the Emperor Hadrian, whose favorite residence was Athens; was subsequently transformed into a church dedicated to the Virgin Mary; for twenty-one centuries had defied the storms of time; and, finally, in 1687, when used by the Turks as a magazine, was burst in twain by a shell fired from a Venetian battery.

Even now, as one gazes on these Acropolis ruins, there is a wondrous and magic beauty which thrills alike the heart of the poet, musician, architect or painter. To the poet's perception here is an aggregation of real poems: the Propylæa, representing a grand drama, with its varied characters embodied in eloquent marble; the graceful and enticing Erechtheium, like an emotional lyric; and the noble Parthenon, truly a brilliant epic commemorative of gods and heroes. To the musician's ear, here echoes a dulcet symphony from all its perfect parts, and its harmonious whole utters a swelling anthem of perpetual melody to all coming ages. To the architect's eye it is a most perfect grouping of the most beautiful structures with the utmost artistic effect, to which

> "The palaces of the present hour
> Must yield their pomp, and wait till ages
> Are their dower."

And to the painter's fancy, with Mount Hymettus washed by the flowing Ilissus as a background, and the Athenian plain encircled with historic hills in front, the Acropolis,

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with its crown of architectural jewels, forms a lovely landscape. The enthusiast, gazing upon that matchless height, sees beauty perched upon every point. Approaching it from the west, a winding road, between imposing marble stairways led to the splendid entrance of the Propylæa, flanked by spacious halls and guarded by the sentinel temple of Wingless Victory, while Phidias' colossal statue of Athene, made of the brazen spoils taken at Marathon, towered high above its roof in all the majestic proportions of the protecting goddess of Attica, born in full panoply from the brain of Jupiter. Within the fortress wall, crowning the summit of the Acropolis, proudly rose above its battlements the wondrous Parthenon, with its marble forest of columns, on which rested its superbly-sculptured pediments; while to the left was visible the matchless Ionic Erechtheium. Nowhere on earth was to be found such a glorious galaxy of architectural masterpieces: a triumphal pile worthy of Athens' renown, and of her greatest citizen—Pericles. Five centuries later, Plutarch wrote: "These works appear, at the present moment, fresh and newly wrought; they seem to wear the bloom of perpetual youth, their glow untouched by time, as if they breathed the breath of immortality."

Pausanias tells us of other small temples, monuments and statues which once adorned the Acropolis, but we will pass them by, as we have already made a long story out of one small hill in the capital of a diminutive state, which never contained half so large a population as now resides in this young city; yet it was the centre of civilization, and the cradle of those great ethical ideas from which arose our more divine Christian dispensation.

Never can I forget one evening hour, when I stood alone, wrapped in thought, upon the Parthenon's broken pediment as the sun's parting rays lit up that matchless ruin

with tints of gold, ruby and sapphire; blazed through the crystal air from far-off Parnassus to the Morean hills; and bathed in a flood of brilliance this fertile field of history from Ægina's coast to the Corinthian sea. Athens' story and Athens' glory yet live, though, in twenty-four centuries, she has been burned by Persians, plundered by Romans, ravaged by Goths, bombarded by Venetians, despoiled by Turks, and even robbed of her treasures by civilized Englishmen. She has survived all this and is still the

> "Clime of the unforgotten brave!
> Whose land, from plain to mountain cave,
> Was Freedom's home or Glory's grave!"

Before me I beheld, upon a gentle knoll, the classic temple of Theseus, almost as perfect as when erected o'er the hero's dust; behind me, nearly as complete, was that exquisite Corinthian gem, commemorative of a musical victory—the Choragic monument of Lysicrates; on the right rose the small octagonal Tower of the Winds, with its faces symbolically sculptured; eastward were the ruins of sixteen of the original one hundred and twenty colossal Corinthian columns of the magnificent Temple to Olympian Jove, once surrounded with a forest of statues; and upon every coigne of vantage around were fragments of the heroic past. In sight of all these temples was the Areiopagus or Mars Hill, where the midnight judges sat in council, and where Paul preached to the Athenians of the Supreme God, above all their gods, who "dwelleth not *in temples made with hands.*" Every glance was to some historic spot. Around Mars Hill was the Agora, where crowns were decreed to Miltiades and Themistocles as saviors of their country, and where that same fickle populace had prescribed the banishment of the latter and the imprisonment of the former. On the opposite side rose the Pnyx, on

whose Bema, or rocky platform, Demosthenes had hurled his phillipics against the king of Macedonia; nearer, at the base of the Acropolis, was the Theatre of Bacchus whose walls had echoed with his surpassing eloquence in the Oration on the Crown; and, beyond, on the Illissus, was the great Stadium, where thousands beheld the gymnic contests of the Panathenaic and other famous festivals. In every direction were celebrated heights—Pentelicus, where embryo temples and statues had slept in purest marble; Lycabettus, to Athens what Monte Mario is to Rome; Hymettus, where one on honey-dew may feed and drink the milk of Paradise; the hill where Musæus sang and died, now crowned with the ruined monument of Philopappus; the height of Colonus, o'erlooking the "sacred way," bordered with heroes' tombs, and near which was the grove of the Academia, where philosophy was discoursed and from whence the wisest of the wise, the almost divine Socrates, was led to his rocky cell of death—a holy spot still pointed out to the traveller. From these near peaks my eye turned towards Marathon, where scarce ten thousand Greeks overwhelmed the hosts of the proud Darius; and, again, it swept the northern horizon from Thermopylæ to Platea and the Bay of Salimis. I could, in fancy, almost hear the earthquake tread of Xerxes' millions marching to their destruction, and see the proud Persian monarch, on his rocky throne, in an agony of despair, looking down upon the defeat of the most powerful armada of antiquity.

Excuse my dwelling so long and so fondly on this delicious landscape and panorama of history, for the sun has set, and I must end my reverie.

> "We gaze and turn away, and know not where,
> Dazzled and drunk with beauty, till the heart
> Reels with its fullness; there—for ever there—
> Chain'd to the chariot of triumphal Art,
> We stand as captives, and could not depart."

SIBERIA—THE EXILES' ABODE.

BY

GEORGE KENNAN,

Author of "Tent Life in Siberia."

I have been asked, many times since my return from Asiatic Russia, "What kind of a country is Siberia? Give us, in a few words, a general idea of its climate, topography and people." I have no doubt that this seemed to my friends a very natural and reasonable question, but it was quite as impossible for me to answer it in a few words as it would have been to answer the question, "What sort of a history has the human race had since its appearance on the globe? Give us, in a few words, a general idea of the evolution of society." I have, therefore, in such cases followed what is said to be the American plan—answered one question by asking another—viz., "What sort of a country is the North American continent. Give me, in a few words, a general idea of its climate, topography, and people, and I will then answer your question about Siberia."

The force of the suggestion is generally appreciated. Every American understands that it is utterly impossible to give any general idea of the climate, topography, and people of the North American continent. The details are too multitudinous and too heterogeneous to be grouped in a single generalization. Oranges, bananas, and pineapples grow on the Isthmus of Panama, but they do not grow on the shores of Hudson Bay. Indians and buffaloes roam over the plains of the Upper Missouri, but they are not found in any great numbers in the mountains of New

England. The people of the North are entirely different in their origin and character from the people of the South, and those of the East differ almost as much from those of the West.

What is true of America, is equally true of Siberia. The country is one of enormous extent, both in latitude and in longitude; it has every variety of climate, from that of the North Atlantic States to that of Novaya Zemlya; and its people are almost as heterogeneous in origin and character as those of the entire western hemisphere taken together. It will readily be seen, therefore, that any attempt to give, in a few words, a general idea of Siberia, must necessarily be a failure. A country which comprises one-tenth part of the entire habitable globe cannot be described in a few words, or brought within the limits of a single generalization.

It is my purpose to-night to give, although not in a few words, a rough outline sketch of that part of Russia's Asiatic possessions which is known as Siberia; and to describe, with as much fullness of detail as time will permit, some of the more striking features of Siberian life, scenery, customs and institutions. In so doing, I propose to take up successively the geography, history, and physical characteristics of the country; to describe a few of its tribes and peoples; and to give brief sketches of sledge travel, of Arctic camp life, of the Siberian Cossacks, of the experience of the survivors of the *Jeannette*, of Siberian cities, trade, and post travel, and of the Siberian exiles.

What I have to say, is based, for the most part, upon my own personal observations, extending over a period of nearly three years; and the statistical information which I shall give you is derived from the best Russian sources—

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chiefly from the researches of the Imperial Geographical Society. With regard to some controverted points, such, for example, as the condition of the Siberian exiles, I shall present views which are widely at variance with popular ideas upon the subject; but I shall give you fully and fairly the facts upon which my opinions rest, and you can draw from them your own conclusions, as I have done.

The first thing with regard to Siberia which it seems to me necessary to emphasize, is its enormous geographical extent. We are all supposed, of course, to be familiar from boyhood with the boundaries and areas of the principal geographical and political divisions of the two hemispheres; but as a matter of fact, our knowledge, especially of the more remote and thinly populated parts of the globe, is very vague and hazy; and this is particularly the case with regard to our knowledge of Siberia. From the disproportionately small scale upon which that country, as compared with other countries, is represented upon all our maps, we unconsciously receive the impression that the country itself is small—an impression which can be overcome only by reasoning and reflection. Very few of us realize, for example, that if we were making a hand atlas of the world, and should use the same scale in drawing Siberia which is used in Stieler's hand atlas of the world for England, we should have to make the Siberian page of our atlas nearly 20 feet in width to accommodate our map. If we used for Siberia the scale adopted by Colton in his atlas of the United States for New Jersey, we should have to increase the width of our page to 56 feet, or in other words to have a book which when spread out open would cover nearly a quarter of an acre, and which would clearly be unavailable for most of the purposes of a hand atlas.

The territory of Siberia extends from the extreme latitude of 41 degrees and 30 minutes in the south, to the latitude of 77 degrees and 30 minutes in the north; and from east longitude 59° 30′ to west longitude 170°.

It thus covers about 36 degrees of latitude and 130 degrees of longitude, and has an area, including the recently acquired territory in the south, of nearly six millions of square miles. Its greatest length, from southwest to northeast, is about five thousand six hundred miles, and its greatest width, from north to south, two thousand five hundred miles. But figures such as these do not make any definite impression upon the mind. You will, perhaps, get an idea of their significance by taking into consideration the following illustration.

If it were practicable to move entire countries from one part of the globe to another, you could take the whole United States of America, from Maine to California and from Lake Superior to Florida, and set it down in the middle of Siberia without anywhere touching the boundaries of the latter territory. You could then take all the states of Europe, with the single exception of Russia, and pack them into the remaining margin, without crowding any of them or cutting off any of the corners; and after having thus accommodated all of our own country and all of Europe, except Russia, you would still have more than a million square miles of Siberian territory to spare.*

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*Comparative areas in Europe and Siberia in English square miles:

Siberian governments and provinces.		American and European States.	
Yakootsk.....	1,517,063	United States.....	3,512,237
Yenesayisk	992,832	Sweden and Norway.	293,848
Preemorskaya.....	731,910	Austria-Hungary ...	240,942

A country of such vast extent must necessarily include all varieties of topography and scenery and all sorts of climate. Disregarding for the present local and partial exceptions, taking climate and topography together, and beginning at the Arctic Ocean, Siberia may be roughly divided into three, broad, east and west zones or belts of country.

1. The great northern toondra, or the treeless region of moss steppes extending along the entire Arctic sea coast from Novaya Zemlya to Bering Strait; 2. The forest region which, with occasional breaks, occupies a wide belt through the centre of the country from the Ooral Mountains to the Okhotsk Sea; and 3. The fertile and arable region which lies along the Central Asiatic and Mongolian frontier, and extends from Perm and Orenburg to the mouth of the Amoor.

The northern and southern boundaries of these great trans-continental belts of country cannot be exactly defined because they are more or less irregular. In some places, as for example in the valleys of the great

Siberian governments and provinces.		American and European States.	
Tobolsk	531,959	Germany	212,091
Tomsk	329,024	France	204,092
Irkootsk	309,177	Spain	182,750
Trans-Baikal	240,770	Great Britain	121,616
Akinolinsk	210,556	Italy	114,296
Toorgai	202,183	European Turkey	62,028
Semipalatinsk	188,291		
Amoorskaya	173,552		
Semiraychinsk	155,290		
Ooral	141,468		
Koolja	27,457		
	5,751,532		4,943,900

rivers, the central forests make deep indentations into the barren region which lies north of them; and in others, the northern steppes break through the central forests, and even encroach upon the beautiful and fertile region along the southern frontier. Generally speaking, however, the imaginary zones or belts of latitude into which I have, for convenience, divided Siberia, correspond with actual physical features of the country.

I will now take up these zones of climate and topography separately and sketch hastily the character of each.

First, The great northern toondra. The northern coast of Siberia, between the southern extremity of Novaya Zemlya and Bering Strait, is probably the most barren and inhospitable part of the whole Russian Empire. For hundreds of miles back from the Arctic Ocean, the country consists almost entirely of great, desolate steppes, known to the Russians as toondras, which, in summer, are almost impassable wastes of brownish-gray Arctic moss saturated with water, and in winter, trackless deserts of snow, drifted and packed by polar gales into long, hard, fluted waves.

The Siberian toondra differs in many essential particulars from all other treeless plains. In the first place, it has a foundation of permanently-frozen ground. Underlying the great moss toondras which border the Lena river north of Yakootsk, there is everywhere a thick stratum of eternal frost, beginning in winter at the surface of the ground, and in summer at a point 20 or 30 inches below the surface and extending to a depth of many hundred feet. What scanty vegetation, therefore, the toondra affords, roots itself and finds its nourishment in a thin layer of unfrozen ground, a mere veneering of arable soil, resting upon a substratum five or six hundred feet in depth, of permanent and im-

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penetrable ice. This foundation of ice is impervious, of course, to water, and as the snow melts in summer, the water completely saturates the soil to as great a depth as it can penetrate, and, with the aid of the continuous daylight of June and July, stimulates a dense growth of gray Arctic moss. This moss, in course of time, covers the entire plain with a soft, yielding cushion, in which a pedestrian will sink to the knee without finding any solid footing. Moss has grown out of decaying moss year after year and century after century, until the whole toondra, for thousands of square miles, is one vast spongy bog.

Of other vegetation there is little or none. A clump of dwarf berry bushes, an occasional tuft of coarse swamp grass, or a patch of storm and cold defying *kedrovnik*, diversifies perhaps here and there the vast brownish-gray expanse; but, generally speaking, the eye may sweep the whole circle of the horizon, and see nothing but the sky and moss.

An observer who could look out upon this region in winter from the car of a balloon, would suppose himself to be looking out upon a great frozen ocean. Far or near he would see nothing to suggest the idea of land, except, perhaps, the white silhouette of a barren mountain range in the distance, or a dark, sinuous line of dwarfed berry bushes and trailing pine, stretching across the snowy waste from horizon to horizon, and marking the course of a frozen Arctic river.

At all seasons and under all circumstances this immense border land of moss toondras is a land of desolation. In summer its covering of water-soaked moss struggles into life, only to be lashed at intervals by pitiless whips of icy rain, until it is again buried in snow; and in winter

fierce gales, known to the Russians as *poorgas*, sweep across it from the Arctic Ocean, and score its snowy surface into long, hard, polished grooves, called *sastroogee*. Throughout the entire winter it presents a picture of inexpressible dreariness and desolation. Even at noon, when the sea-like expanse of storm-drifted snow is flushed faintly by the red, gloomy light of the low-hanging sun, it depresses the spirits and chills the imagination with its suggestions of infinite dreariness and solitude; but at night, when it ceases to be bounded even by the horizon, because the horizon can no longer be distinguished; when the pale green streamers of the aurora begin to sweep back and forth over a dark segment of a circle in the north, lighting up the whole white world with transitory flashes of ghostly radiance, and adding mystery to darkness and solitude, then the Siberian toondra not only becomes inexpressibly lonely and desolate, but takes on a strange, half terrible unearthliness, which awes and yet fascinates the imagination.

The climate of this great northern toondra is the severest in the Russian Empire, and, for that matter, the severest in the known world. As you go eastward from the Ooral Mountains through this barren zone, the mean annual temperature gradually decreases, until, shortly after crossing the river Lena, you reach, in latitude 67° 30′, on the border of the great toondra, a lonely Russian settlement, called Verkhoyansk, or the upper settlement of the Yana, a village which is known throughout Siberia, and is beginning to be known throughout the world as the Asiatic pole of cold.

The fact is doubtless familiar to you all, that the magnetic pole, and probably the pole of greatest cold, do not coincide with the geographical pole. There are two points in the northern hemisphere, one in the American Arctic

Archipelago, and one in Northeastern Siberia, where the cold is severer than in any region lying further north which has yet been explored. The Siberian pole of cold is at or near Verkhoyansk. Russian observations made at this settlement show the following mean temperatures: For the entire year 4 degrees above zero Far.; mean temperature for December, 46 degrees below; for January, 55 degrees below; for February, 54 degrees below—or an average temperature of 51 degrees below zero for the three winter months. In 1869 the thermometer at Verkhoyansk went repeatedly below 70 degrees, and fell once to 81 degrees. The record is given by the eminent Russian meteorologist Dr. Woeikof, who vouches for the trustworthiness of the observations, and an account of them may be found in the English scientific journal, "Nature," for the 10th of last March. Such in topography and climate is the great northern toondra.

Immediately south of this barren region, and extending, with occasional breaks, from the Ooral Mountains to the Okhotsk Sea, lies the second of the three zones into which I have provisionally divided Siberia—the zone of forests. As you go southward from the Arctic Ocean and get gradually into a less rigorous climate, trees begin to make their appearance. At first there are only a few stunted and storm-twisted larches struggling for existence on the edge of the toondra; but they gradually grow larger and more abundant, pines and firs make their appearance, then birch, willow and poplar, until at last you enter a vast primeval forest, through which you may travel in a straight line for weeks together.

This zone of forests has an area of hundreds of thousands of square miles, and stretches almost entirely across

Siberia. Along its northern boundary, the climate, although less rigorous than the climate of the toondra, is still severe; but long before you get through to its southern edge the temperature grows milder, poplars, aspens, elms and the Tartar maple take the places of firs, larches and pines, and you come out at last, 1,000 or 1,500 miles from the Arctic Ocean, into the more open, fertile and arable zone of Southern Siberia. This beautiful and picturesque country presents, at least in summer, nothing which would even remotely suggest an Arctic region. If you were blindfolded and transported to it suddenly in June, you could never guess to what part of the world you had been taken. You would find its sky as clear and blue and its air as soft as the sky and air of California; the trees would all be in full leaf; birds would be singing in every thicket; there would be a drowsy hum of bees and a faint fragrance of flowers in the air; and the turf under your feet would be sprinkled with violets, primroses and forget-me-nots. Everything which you saw, felt and heard, would tend to convince you that you were in some particularly favored part of the temperate zone.

There are in all the Russian Empire few, if any, more beautiful regions, than the environs of Irkootsk and Barnaool, or the valley of the Amoor in Southern Siberia.

The soil is a rich, black loam, as fertile as the soil of an English garden; flowers grow everywhere in the greatest profusion; the woods are full of rhododendron, wild cherry and flowering acacia; the country is neither all plain nor all forest, but a blending of both; it is broken just enough by hills and mountains to give picturesqueness to the landscape; and it is, during half the year, fairly saturated with golden sunshine. I do not wish, of course, to convey

the idea that in this country it is always summer. Southern Siberia has a winter, and a severe one, but not, as a rule, much severer than that of Minnesota, while its summer is warmer and more genial than that of many parts of Central Europe.

In this fertile and arable zone of Southern Siberia, which is a belt of country four or five hundred miles wide, lying along the Central Asiatic and Mongolian frontier, there are eight large cities which have a higher mean temperature for the months of June, July and August, than the city of London. In fact, the summer temperature of this entire belt of country from the Ooral Mountains through to the Pacific, averages six degrees higher than the mean summer temperature of England. Irkootsk is 5 degrees warmer in summer than Dublin, the mines of Nerchinsk have a higher summer temperature than London, the summer climate of Omsk corresponds almost exactly with that of Portland, Maine, and Semipalatinsk is warmer than Boston.*

If you have not given some attention to the subject, these figures will, perhaps, surprise you—as Siberia itself did me.

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* Mean Summer Temperatures.

In Siberia.	Far.	*In Europe and America.*	Far.
Semipalatinsk	68.5	London	60
Omsk	64	Dublin	57
Barnaool	63.7	Portland, Me	66.6
Krasnoyarsk	63	Boston	68.2
Tobolsk	62.4	Milwaukee	68.6
Tomsk	62.2	Marquette, Mich	66.6
Irkootsk	61.5	Buffalo, N. Y	69
Nerchinsk	61		

M. Woeikof in "Statistics of the Russian Meteorological Society," April, 1871, St. Petersburg.

Report of the Chief Signal Officer of the United States for 1880.

Encyclopedia Britannica, ninth edition.

We have all had, from childhood, the impression that Siberia—the abode of the exiles—is one of the loneliest, dreariest, most desolate parts of the globe—a country where winter reigns supreme throughout almost the entire year, and where simple existence is a constant struggle with an inhospitable climate. Of a part of Siberia this is true, but not of the part which is at present under consideration. I hope to show you even more conclusively before I finish, that Siberia has more than one sort of climate, and that it is far from being the cold, dreary, uninhabited waste which we almost unconsciously picture to ourselves when we hear its name. For the present I must leave the subject of climate and topography and take up Siberian history, asking you only to remember the division of the country into the northern toondra, the central forest, and the fertile region along the southern frontier.

The history of Siberia is, in its earlier chapters and in its main outlines, a history of the Siberian Cossacks. The country was discovered, or at least first invaded, by Cossacks, it was conquered by Cossacks and explored by Cossacks; and the descendants of this brave, hardy and adventurous people, now form one of the largest and most valuable parts of its population.

In the year 1579, Yermak Timofayef, a Cossack marauder from the lower Volga, at the head of a few hundred men, crossed the Ooral Mountains, the eastern frontier of Russia, and fought with the Tartars the first of the long series of battles and skirmishes which ended in the conquest of Siberia. Following up promptly the victories of Yermak, the Russians pushed on steadily to the eastward through Northern Asia, and before the close of the century, had

established themselves securely upon the banks of the Irtish, near the site of the present city of Tobolsk.

From that time, the march of exploration and conquest went on with almost unexampled rapidity and success. In 1604, the Russian advance reached the river Ob; in 1621, exploring parties of Cossacks crossed the Yenesay; and in 1628, the flag of Russia was planted on the banks of the Lena, more than 3,000 miles east of Moscow, in the heart of Northern Asia. As they marched to the eastward, the Cossacks sent exploring parties down all the great Arctic rivers which they crossed, and before 1640, the Arctic Ocean north of Asia had been reached at the mouths of the Ob, the Yenesay, the Lena and the Yana, in latitudes ranging from 67° to 73° north.

In 1639, the Russians reached the sea of Okhotsk, and discovered that great river the Amoor, and in 1644, a Cossack named Michael Stadukhin advanced eastward from the Yana towards Bering Strait, and established a settlement which is now called Neezhnee Kolymsk, on the coast of the Arctic Ocean, more than 2,000 miles east of the farthest point attained by the Dutch and English in their search for a northeast passage. In 1648, Simeon Dezhnef, another of these indefatigable Cossack explorers, sailed from the mouth of the Kolyma river, along the coast of the Arctic Ocean, to East Cape, discovered and passed through the strait which now bears the name of Bering, and entered the Pacific Ocean from the north.

In the meantime, fresh detachments of Cossacks were pouring into Siberia across the Oorals and spreading far and wide over the country. Some made themselves rude canoes and floated thousands of miles down the great Arctic rivers, building forts and founding settlements as

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they went; some plunged on horseback into the great, tangled, primeval wilderness of the central forests; some wandered with dog and reindeer sledges over the snowy desert of the northern toondra; and some crossed the mountain range of Stanavoi, invaded Kamchatka, and planted the Russian standard on the coast of the Pacific 6,000 miles east of Moscow. Fighting, starving, freezing, but always pushing on, these indomitable Cossacks slowly overran the vast wilderness of Siberia, until, before the middle of the seventeenth century, every wild Siberian tribe, from the Altai Mountains to the Arctic Ocean and from the Oorals to the Pacific, were familiar with the name and the fame of the *Kazakee*. In less than eighty years the Cossacks had overrun and virtually subjugated a country which extended over 25 or 30 degrees of latitude and 130 degrees of longitude, and had added to the dominions of the Tsars more than three million square miles of new territory. The annals of conquest in modern times do not record a more brilliant achievement.*

At the present time, according to the best obtainable census statistics, Siberia has a population of 6,250,000, and it comprises representatives of thirty different tribes and nationalities.†

Among the more prominent of these are the Russians (including Cossacks, colonists and exiles), the Samoyades, the Ostiaks, the Toongooses, the Tartars, the Boorats, the Yakoots, the Koraks, the Chookchees and the Kamchadals.

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*Wrangell, "Siberian Expedition;" Erman, "Travels in Siberia;" Coxe, "Russian Discoveries;" Khoroshkin, "The Cossack Forces of Russia."

†"Statistics of the Siberian Natives." By M. Venyookof, Bulletin of the Imperial Geographical Society. January 1st, 1874.

The entire Siberian population may be divided according to mode of life into two great classes, nomadic and settled. The nomads, including the Samoyades, the Toongooses and the Chookchees, live for the most part in fur tents, and wander winter and summer over the great northern toondra. Of the settled tribes, the Ostiaks and Yakoots are fishermen inhabiting the central forest region along the rivers Ob and Lena; the Tartars are mainly herdsmen and horse breeders living in that part of the fertile region between Orenburg and Omsk; and the Boorats are a thrifty tribe of farmers and teamsters settled around and in the neighborhood of Lake Baikal. The Russians are scattered more or less over the entire country, but nine-tenths of them live in the fertile zone of South Siberia. The only subdivisions of the Russian population which call for particular notice, are the exiles and the Cossacks. Of the exiles I shall give a full description hereafter. The Cossacks, who are largely the descendants of the conquerors of the country, number 291,971, and are settled in 746 stations and villages, mostly in South Siberia.*

They are nominally soldiers, and the men are liable at any time to be called on for military service; but practically they are farmers, fishermen, fur hunters and teamsters, like the rest of the settled population; and as a compensation for their liability to military service they are granted by the government certain special privileges, such as exemption from taxation.

The Siberian Cossacks, taken at their best, are among the finest specimens of the Russian common people. They are brave, enterprising, faithful and intelligent; they

* "The Cossack Forces of Russia," by Col. Khoroshkin, St. Petersburg, 1881.

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shrink from no service to which they may be assigned, however full of hardship or peril; and some of them—as, for example, the Cossacks of the great northern toondra—are the best comrades and campers-out in the world. They never seem to get tired, they are never discouraged, never daunted, never cross. They have a fund of energy and good humor which carries them triumphant through the severest hardships and perils, and which enlivens the loneliest, dreariest camp with songs and laughter. Many a time I have seen them come into camp on dog-sledges at night, after a ten hours' struggle with a fierce Arctic gale, every man of them cold, tired, hungry and whitened from head to foot with the flying snow, and as they cleared away with snow-shovels a place for a fire, they would ridicule one another's appearance, joke one another upon any exhibition of weakness or unskillfulness which had been shown during the day, laugh at their own misfortunes, and treat the storm, and the whole dismal experience as if they were merely an excuse for a grand frolic.

The means of overland transportation in Siberia are of three kinds—horses, reindeer and dogs. In the fertile zone of South Siberia there are almost everywhere good roads, and here horses are used with wagons in summer and sleighs in winter. In the forest zone, roads are of rarer occurrence, and the great Arctic rivers, with their tributaries, furnish the only easy means of intercommunication between settlements. North of the central forest there are no roads whatever, and in most parts of the great northern toondra the use of horses is impracticable. Here, therefore, the dog and the reindeer come into play. The Samoyades, the Toongooses and the Chookchees, who keep herds of domesticated reindeer, use the deer to draw their sledges; but the

Russians and all the settled natives of Arctic Siberia use the dog. The distances which are travelled with dog-sledges in Northern Asia are enormous. A party of Cossacks think nothing of harnessing ten or twelve dogs to each of their long narrow sledges, loading the sledges breast high with dried fish and frozen reindeer meat, and starting off for a journey of 1,000 or 1,500 miles across trackless deserts of snow.

A winter journey over the great northern toondra is inexpressibly lonely and monotonous. Day after day the eye rests upon the same illimitable expanse of storm-drifted snow, and night after night the traveller camps in an utter solitude, over which seems to brood the mournful silence of universal death. I do not know how to describe in words the impression of sadness, loneliness and isolation from all human interests, which these great barren plains make upon the imagination. The world which you have left, with all its cares, strife and busy activity, fades away into the unreal imagery of a dream; and you seem removed to an infinite distance from all the interests and occupations of your previous life. You cannot realize that you are still in the same busy, active, money-getting world in which you remember once to have lived. The cold, still atmosphere, the red, gloomy twilight of the low-hanging sun, and the great white ghastly ocean of snow around you, are all full of cheerless, mournful suggestions, and have a strange unearthliness which you cannot reconcile or connect with any part of your previous life.

The pleasantest feature of winter travel in Siberia is camping-out at night. All day long you suffer from cold, hunger and fatigue; you lose your way in blinding snow-

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storms, or become exhausted by the constant struggle to keep warm in a temperature of 40° or 50° below zero; but the anticipation of the bright evening camp-fire sustains your flagging spirits, and enables you to hold out until night. We usually camped as soon as we could find wood for a fire after it grew dark. Three sledges were drawn up together so as to make a little enclosure about ten feet square; the snow was all shovelled out of the interior and banked up around the sides like a snow fort; and a fire was built at the open end. This little snow cellar was then strewn to a depth of three or four inches with twigs of trailing pine; shaggy bearskins were spread down to make a warm, soft carpet; and our fur sleeping-bags and swans-down pillows arranged for the night. In the middle of the enclosed space stood a low table improvised out of a candle box, on which one of our native drivers soon placed two cups of steaming tea, a few pieces of frozen rye bread and some dried fish. Then stretching ourselves out in luxurious style upon our bearskin carpet, with our feet to the fire and our backs against pillows, we smoked, drank tea, and told stories in perfect comfort. After supper, the natives piled dry branches of trailing pine upon the fire until it sent up a column of flame ten feet in height, and then, squatting in their favorite position around the blaze, they would sing for hours the wild, melancholy songs of the Kamchadals, or tell never-ending stories of hardship and adventure on the coast of the Icy Sea. At last, the great constellation of Orion marked bedtime. Fur stockings were taken off and dried by the fire, the dogs were fed their daily allowance of one dried fish each, and putting on our heaviest fur coats, we crawled feet first into our wolfskin bags, pulled them up over our heads, and slept.

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A camp, in the middle of a dark, clear winter's night, presents a strange, wild appearance. Imagine, if you can, that you have waked up at some unknown hour after midnight, and have thrust your head out of your frosty fur bag, to see by the stars what time it is. The fire has died away to a few glowing embers. There is just light enough to distinguish the dark, crouching forms of the natives, some sitting upon their heels, with their backs against sledges, some squatting in a row by the fire, and all asleep. Away beyond the limits of the camp stretches the desolate steppe in a series of long snowy waves, which blend gradually into a great white frozen ocean, and are lost in the distance and darkness of night. High overhead, in a sky which is almost black, sparkle the bright constellations of Orion and the Pleiades, the celestial clocks which mark the long, weary hours between sunset and sunrise. The blue, mysterious streamers of the aurora tremble in the north, now shooting up in clear, bright lines to the zenith, and then waving back and forth in great majestic curves over the silent camp, as if warning back the adventurous traveller from the unknown regions around the pole. The silence is as profound as death. Nothing but the pulsating of the blood in your ears and the heavy breathing of your sleeping men, breaks the universal lull.

Suddenly there rises upon the still night air a long, faint, wailing cry, like that of a human being in the last extremity of suffering. Gradually it swells and deepens, until it seems to fill the whole atmosphere with its volume of mournful sound, dying away at last into a low, despairing moan. It is the signal howl of a Siberian dog. In a mo-

ment it is taken up by another upon a higher key ; two or three more join in, then a dozen, then twenty, fifty, eighty, until the whole pack of one hundred dogs howls an infernal chorus together, making the air fairly tremble with sound, as if from the heavy bass of a great organ.

For fully a minute heaven and earth seem to be full of yelling, howling fiends. Then, one by one they begin to drop off, the unearthly tumult grows fainter and fainter, until at last, it ends as it began, in one long and inexpressibly melancholy wail, and the camp becomes silent again as death. One or two of your men move restlessly in their sleep, as if the mournful howls blended unpleasantly with their dreams, but no one wakes, and a death-like silence again pervades heaven and earth.

Suddenly the aurora shines out with increased brilliancy, and its waving swords sweep back and forth across the dark, starry sky, and light up the snowy steppe with transitory flashes of colored radiance, as if the gates of heaven were opening and closing upon the dazzling brightness of the celestial city. Presently it fades away again to a faint, diffused glow in the north, and one pale green streamer, slender and bright as the spear of Ithuriel, pushes slowly up toward the zenith until it touches with its translucent point the jewelled belt of Orion. Then it, too, fades and vanishes, and nothing but a bank of pale white mist on the northern horizon, shows the location of the celestial armory whence the Arctic spirits draw the gleaming swords and lances which they brandish nightly over the lonely Siberian steppes.

With the earliest streak of dawn the camp begins to show signs of animation. The dogs get out of the deep

holes which their warm bodies have melted in the snow; the natives push their heads out of the neck-holes of their fur coats, and whip off the mass of frost which has accumulated around the aperture; a fire is built, tea boiled, and you crawl out of your fur bag to breakfast. Fifteen or twenty minutes are spent in drinking tea and eating dried fish. The sledges are then packed, the runners wet down to cover them with a coating of ice, and before the aurora fades away in the increasing light of sunrise, you are riding again at a brisk trot across the steppe. In this monotonous routine of riding, camping and sleeping, day after day, and week after week passes slowly and wearily away.

Such, in brief and rapid outline, are the geography, topography, climate, history, people and travelling methods of Siberia. You have now, I think, a sufficiently clear and accurate idea of that great territory to enable you to consider fairly and intelligently the question of Siberian exile, and to that subject I ask your attention. *

*The principal Russian authorities which have been consulted in the preparation of this account of Siberian exile are as follows:

1. "Materials for a Statistical History of Russian Crime;" by E. N. Anoochin. Annals of the Imperial Geographical Society, Vol. 3. St. Petersburg, 1873. (For this paper the author was awarded the gold medal of the Society.)

2. "Siberia and Hard Labor Exile;" by S. Maximof. St. Petersburg, 1871.

3. "Reformatory Influence of Russian Exile;" by N. M. Yadrintsef. *Dyello* (a Russian magazine). St. Petersburg, 1871. Nos. 1 and 2, January and February.

4. "The Siberian Prison World;" by Sh. N. Reutski. *Rooski Vaistnik* (a Russian magazine). Moscow, 1870. Nos. 2 and 3, February and March.

5. "Life in the Siberian Mines;" by K. Zolotilof. *Rooski*

Ever since the publication of Madame Cottin's "Elizabeth," the whole civilized world has taken a deep and painful interest in the fortunes and fate of Siberian exiles. Again and again, in books, in magazines, and in newspaper leaders throughout the world, the subject has been taken up and discussed; sometimes with sympathy and pity, sometimes with prejudice, but always with ignorance. Novelists and dramatists have used the supposed facts of Siberian exile as themes for stories and plays; political leader writers, like Grenville Murray, have used them to inflame prejudice against Russia; writers on social science have used them in discussing methods of repressing crime; and in fact it has been almost impossible, since the Crimean war, to take up a newspaper or a magazine, in England or

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Vaistnik. Moscow, 1863. Nos. 1, 2 and 4; January, February and April.

6. "Statistics of Crime in Russia;" *Otechestvennie Zapeeski* (a Russian magazine). St. Petersburg, 1868. No. 11, November.

7. "Oolozhenie o Nakazaniakh;" the Russian Criminal Code. St. Petersburg, 1867.

8. "Siberia and Hard Labor Exile;" a Review. *Dyello* (a Russian magazine). St. Petersburg, 1871. No. 3, March.

9. "Gold Placers in Siberia;" by G. E. Shchoorofski. *Rooski Vaistnik.* Moscow, 1864. No. 3, March.

10. "Notes from a House of the Dead;" by Fedor Dostoyefski. St. Petersburg, 1862.

11. "Bulletin of the Imperial Geographical Society." St. Petersburg, 1878, 1879 and 1880.

12. Tegeborski's "Productive Forces of Russia;" an English translation.

13. "The Cossack Forces of Russia;" by Staff Colonel Khoroshkin. St. Petersburg, 1880.

14. "Report of the Siberian Olekminsk-Vitimsk Scientific Expedition to the Trans-Baikal;" Annals of the Imperial Geographical Society. St. Petersburg, 1875.

America, which, if it mentioned Russia at all, did not make some reference to Siberian exile. Probably no social question was ever so much discussed and so little understood.

For nearly a score of years the *London Standard*, the *Pall Mall Gazette*, and the English Tory papers generally, have been printing heart-rending accounts of the horrors of the Siberian mines, and of the cruelties practised upon exiles in the Siberian penal settlements. As an illustration of this sort of information, which has done so much to form American opinion on the subject, permit me to read two brief extracts from the *Pall Mall Gazette* and the *London Standard*. The *Pall Mall Gazette* says: "The exiles who live in the mines are convicts of the worst type, and political offenders of the best. The murderer for his villainy, and the intelligent Polish rebel for his patriotism, are deemed equally worthy of the punishment of slow death. They never see the light of day, but work

15. "The Progressive Movement of Russia into Northern and Eastern Asia;" by M. I. Venyookof. *Rooski Vaistnik.* St. Petersburg, January, 1877, No. 1.

16. "A Collection of Statistical Information Concerning Russia;" edited by M. P. Zablotski, and published by the Imperial Geographical Society. St. Petersburg, 1859.

17. "Geographical and Statistical Dictionary of the Russian Empire;" edited by P. Semyonof, and published by the Imperial Geographical Society. St. Petersburg, 1862–74.

18. "A Report on the Penal System of Russia;" by Count Sollohub. Transactions of the International Penitentiary Congress at London in 1872. State Department, Washington, D. C., 1873.

19. "Transactions of the International Prison Congress held at Stockholm in August, 1878;" statements of the Russian delegates with regard to Siberian exile. State Department, Washington, D. C., 1879.

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and sleep all the year round in the depths of the earth, extracting quicksilver under the eyes of taskmasters who have orders not to spare them. They sleep in recesses hewn out of the rock—very kennels—into which they must creep on all fours. Prince Joseph Lubomirski, who was authorized to visit one of the mines at a time when it was not suspected that he would ever publish an account of his explorations, has given an appalling description of what he saw. Convicts racked with the joint-pains which quicksilver produces—men whose hair and eyebrows had dropped off, and who were as gaunt as skeletons—were kept to hard labor under the lash, and must toil until exhausted nature robbed them of the use of their limbs, when they were hauled up to die in the hospital. Five years in the quicksilver pits are enough to turn a man of thirty into an apparent sexagenarian, but some have been known to struggle on for ten years. Women get no better treatment than the men. Polish ladies by the dozen have been sent down to rot and die, while the St. Petersburg journals were declaring that they were living as free colonists."

The *London Standard* says: "Winter there lasts eight months, a period during which the surrounding country presents the appearance of a noiseless, lifeless, frozen marsh—no roads, no communication with the outer world, no means of escape. In course of time, almost every individual exile is attacked by nervous convulsions, followed by prolonged apathy and prostration. Some of them contrive to forge false passports, and by a miracle, as it were, make their escape; but the great majority of these victims of the Third Section either go mad, commit suicide, or die of delirium tremens. Their history, when the time comes

for it to be studied and published, will disclose a terrible tale of human suffering."

I shall give you presently some facts which will enable you to form an independent judgment as to the trustworthiness of these remarkable statements; but in the meantime I will just parenthetically remark, that there is not such a thing, and never has been such a thing as a quicksilver mine in all Siberia, and that in the country which the *London Standard* describes as a "noiseless, lifeless, frozen marsh," there are raised every summer 250,000 lbs. of tobacco.

Before proceeding to describe the present condition of the Siberian exiles, I must review hastily the history of the exile system. Exiles began to be sent to Siberia soon after its discovery and conquest—as early, probably, as the first half of the 17th century. The first mention of exile in Russian legislation is in a law of the Tsar Alexay Michaelovich promulgated in 1648. Exile, however, at that time, was regarded not as a punishment in itself, but as a means of getting criminals who had already been punished, out of the way.

The Russian criminal code of that age was almost incredibly cruel and barbarous.* Men were hanged and beheaded by the hundred for crimes which would not now be regarded as capital in any civilized country in the world, and lesser offenders were flogged with the knoot and bastinado, branded with hot irons, mutilated by the amputation of one or more of their limbs, and suspended in the air by hooks passed under two of their ribs until they died a lingering and miserable death. When criminals had been

* See "History of Russia," by Alfred Rambaud. Vol. I., p. 307.

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thus knooted, bastinadoed, branded, or crippled by amputation, Siberian exile was resorted to as a quick and easy method of getting them out of the way, and in this attempt to rid society of criminals who were both morally and physically useless, or worse than useless, Siberian exile had its origin. The amelioration, however, of the Russian criminal code, which began in the latter part of the 17th century, and the progressive development of Siberia itself, gradually brought about a change in the view taken of Siberian exile. Instead of regarding it, as heretofore, as a means of getting rid of disabled criminals, the Government began to look upon it as a means of populating and developing a new and promising part of its territory. About the close of the 17th century, therefore, we find a number of ookazes abolishing personal mutilation as a method of punishment, and substituting for it, and in a large number of cases even for the death penalty, the banishment of the criminal to Siberia, with all his family.

In the 18th century the great mineral and agricultural resources of Siberia began to attract to it the serious and earnest attention of the Russian Government. The discovery of the Daoorski silver mines, and the rich mines of Nerchinsk in the Siberian province of the trans-Baikal, created a sudden demand for labor, which led the Government to promulgate a new series of ookazes, providing for the transportation thither of convicts from the Russian prisons. At the same time, exile, as a punishment, began to be extended to a large number of crimes which had previously been punished in other ways; as, for example, desertion from the army; assault with intent to kill; and vagrancy, when the vagrant was unfit for military service,

and when no village commune or landowner would take charge of him.

In 1762 permission was given to all individuals and corporations owning serfs, to hand the latter over to the local authorities for banishment to Siberia, whenever they thought they had good reason for so doing. With the entire abolition of capital punishment in Russia in 1753, all criminals who under the old law would have been put to death, were condemned to perpetual exile in Siberia, with hard labor.

In the reign of Catherine the Second the demand for labor in Siberia became more and more imperative, by reason of the discovery of the rich and important mines of Ekaterineburg, and the opening of large manufacturing establishments at Irkootsk; and the list of crimes and offences which were punishable by exile grew larger and larger. Jews were exiled for refusing or neglecting to pay their taxes for three successive years; peasants were exiled for cutting timber without permission; non-commissioned officers of the army were exiled for second offences of various kinds; and bad conduct of any sort became a sufficient warrant for banishment.

It is evident, from the history of the development of Russian criminal law in the 17th and 18th centuries, that the main object, or one of the main objects, of sending criminals to Siberia, was to settle and colonize that country. All the laws of that time direct that exiles shall be established in agricultural pursuits in the places to which they are banished; and in the 18th century we find many ookazes providing that all exiles not condemned to hard labor, shall be furnished, upon their arrival in Siberia, with

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food, seed, agricultural implements and horses, to enable them to begin life anew as farmers.*

Since the beginning of the present century, the history of the Siberian exile system has been a history of gradual but steady amelioration.

The bad and cruel features of the old system have been greatly modified or entirely done away with; the arrangements for the transportation of exiles to their places of banishment have been systematized, regulated and greatly improved; houses have been built for their accommodation along the road; the provisions for their re-establishment in life in their new homes have been greatly extended; compulsory labor in the mines has been restricted, for the most part, to criminals whom we would imprison for life or hang; flogging with the knoot has long been abolished; fetters and chains have been done away with, except in the cases of prisoners who manifest a disposition to resort to violence; and there was established in September last at St. Petersburg, under the presidency of General Cherayvin, a commission for the mitigation of the penalties of exile, which has already reviewed the cases of 650 political criminals, and set 328 of them at liberty.

Under the present exile laws, men and women are sent to Siberia for all sorts of crime, from murder to larceny; and their sentences are of all degrees of severity, from perpetual banishment with twenty years of hard labor, which

* Maximof, who paints the exile system and its evils in the darkest colors, admits that in 1827 the Russian government spent 481,000 roubles in establishing exiles in agricultural pursuits in the Siberian Government of Yenesayisk. Maximof; "Siberia and Hard Labor Exile." Part 1, page 282.

is the maximum sentence, down to simple banishment for four years.

As a general rule, exile to Siberia under the severer sentences and for felony, involves, first, deprivation of all civil rights; second, forfeiture of all property, which, upon the conviction of the criminal, descends to his heirs as if he were dead; and, third, severance of all family relations, unless the criminal's family voluntarily accompanies him to his place of exile. If a prisoner's wife and children wish to go with him, they are allowed to do so, and are furnished by the Government with transportation; but if not, the authority of the criminal over his family ceases with his exile.

Since the year 1827, full and accurate statistics have been kept of the workings of the exile system; and as these statistics throw a clearer light upon the subject than anything which I could say, I will give a brief analysis of them.* In the twenty-year period, from 1827 to 1847, the number of exiles sent across the Russian frontier into Siberia was 159,755, of whom 134,315 were men and 25,440 women; 79,909 were exiled by administrative process—that is, by executive order without judicial trial, and 79,846 after trial and sentence by a court.

The first important question which presents itself upon a review of these figures is: "For what crimes were these 160,000 exiles banished?" The collection of statistics from which I am quoting answers this question with the greatest fullness of detail, as follows: Of these 160,000 criminals, 48,000, or thirty-three per cent., were exiled for vagrancy;

* Anoochin's "Materials for a Statistical History of Russian Crime." Published by the Imperial Geographical Society.

40,000, or twenty-five per cent., for burglary, robbery or larceny; and 14,000, or eleven and a half per cent., for murder and homicide. Seventy per cent., therefore, of all the exiles sent to Siberia in this twenty-year period were vagrants, robbers or murderers.

The extraordinarily large proportion of so-called vagrants reveals one of the bad features of the old exile system. Under the old law, any peasant who did not belong to some village commune or to some landed proprietor, and who was found wandering around without a passport and without any visible means of self-support, was forthwith arrested and exiled to Siberia by administrative process. The object of this was to settle Siberia and furnish it with laborers, by the wholesale deportation thither of all persons who were useless in European Russia, who had no settled place of abode, and who threatened to become a burden upon society. The end of the law was attained—Siberia was settled—but the law was nevertheless a cruel and a barbarous one.

The next question which suggests itself is: "What proportion do the criminal exiles—that is, the common felons—bear to political exiles, such as Nihilists, Poles, and other conspirators against the state?" The popular impression is that the latter class is altogether the larger; that, in fact, nearly all of the exiles to Siberia are sent there for political reasons; and that, to use the words of the Nihilist agitators, "Thousands of delicate and high-born men and women are wearing their lives out in Siberian mines in a slavery which is worse than death." But this is not at all the case. Of the 160,000 exiles sent to Siberia in the twenty-year period now under consideration, only 443, or one-quarter of one per cent., were exiled for political offences.

The statistics of political exile reveal another interesting and significant fact. It is said by the Nihilist agitators that their movement is a popular movement—an uprising of the people against intolerable oppression. If such were the case, we should naturally expect to find at least a fair proportion of the common people among the political exiles; but this is exactly what we do not find. Of the 443 exiles sent to Siberia during this twenty-year period, for crimes against the state, nearly two-thirds were nobles, and only a little more than one-third was furnished by all the other classes of society together. The nobles, although they compose only one and a half per cent. of the whole Russian population, furnish sixty-three per cent. of the whole number of political exiles.

Another question of some importance which suggests itself in connection with Siberian exile is, "How many exiles succeed in making their escape from the country to which they are banished?" The general impression is that escape is very difficult and very rare; but this, too, is an error. More than a thousand exiles escape from Siberia and return to European Russia every year. In the twenty-year period which I am now considering, 18,328 fugitives from Siberia were re-arrested in European Russia and sent back to their respective places of exile. The amount of crime of all kinds in the Governments of European Russia which border on the Siberian frontier is nearly double that of the Governments of the interior, for the sole reason that they are overrun by fugitive criminals from Siberia.

The last question of importance which suggests itself is, "What are the relative proportions between the exiles who are condemned to imprisonment or hard labor and the

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exiles who are simply banished?" In answering this question I will take a period nearer to the present time, as representing more nearly the present working of the exile system. In the five years from 1867 to 1872 there were sent to Siberia 64,274 exiles; or an average number of 12,885 per year. Of this whole number only 5,364, or about eight per cent., were sentenced to imprisonment or hard labor for a term of years; 58,910, or nine-two per cent., were simply banished, and had an opportunity in a new and fertile country to go to work for themselves, and by industry, honesty and sobriety, to retrieve their fortunes. These 64,274 exiles were voluntarily accompanied to Siberia by 18,208 women and children.

As it is somewhat difficult to fix in the memory such a mass of figures as I have given you, I will briefly recapitulate the results of my analysis of these statistics. The number of exiles sent to Siberia annually ranges from 10,000 to 12,000. Only one-quarter to one-half of one per cent. are political exiles, and the remainder, more than ninety-nine per cent., are common felons. Of the political exiles, nearly two-thirds are nobles. Only eight per cent. of all the exiles sent to Siberia are condemned to hard labor; ninety-two per cent. are simply banished as free colonists. Every thousand exiles sent to Siberia, is accompanied by four hundred women and children, who voluntarily go with their husbands and fathers at the Government's expense. The number of exiles who, in one way and another, escape from Siberia and return to European Russia, exceeds a thousand a year.

I will now proceed to a consideration of the questions, to what parts of Siberia the exiles are sent, how they are transported to their places of banishment, and what be-

comes of them when they get there. You will remember that in the earlier part of my lecture, I divided Siberia along the parallels of latitude into three broad east and west zones, or belts of country: first, the northern, or zone of moss toondras; second, the central, or zone of forests; and third, the southern, or zone of fertile and arable land along the Central Asiatic and Mongolian frontier. All the exiles from European Russia, with perhaps a few rare exceptions, are sent to the last-named of these belts of country —the fertile zone of South Siberia. I never heard of an exile's being sent to the northern toondras, and during the two years that I wandered over those toondras in the north-eastern part of the country, I never saw an exile. Exiles are rarely sent as far north even as the forest zone, unless, after being banished to South Siberia, they commit another crime which calls for severer punishment. Ninety-nine per cent. of all the exiles from European Russia go to Southern Siberia; and more than half of them go to places which lie from one to ten degrees south of the places where they were born.

A criminal, therefore, from Northern Russia, who is exiled to Siberia, goes to a better climate, not to a worse one, and to a country far more fertile than that where he has previously lived. The celebrated convict settlement of Nerchinsk, for example, lies eight degrees south of St. Petersburg, and four degrees south of Moscow, and corresponds almost exactly in latitude with Berlin.

The popular impression is that exiles are sent to a bleak, desolate, uninhabited Arctic waste, where winter lasts almost the entire year, and where resources for the maintenance of life are of the scantiest character. In order to show how erroneous these impressions are, I must resort

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again to statistics; and as time will not permit me to go into a detailed examination of all South Siberia, I will take, as a fair illustration of the fertile zone generally, the Siberian province of the Trans-Baikal, a province of Eastern Siberia, to which a large part of the exiles are sent, and a province which contains two of the largest of the exile mining settlements—the mines of Nerchinsk and the mines of Karà.

This province lies immediately east of Lake Baikal, and immediately north of the Mongolian frontier, between the head waters of the rivers Lena and Amoor. It has an area of 10,000 square miles, and a population of 240,000 souls, of whom 106,000 are Russians. There are in the province, 667 towns, villages and settlements, which contain 334 churches and places of worship. The statistics of animal industry show that the inhabitants of this province own 180,000 horses, 240,000 horned cattle, 450,000 sheep and 3,500 camels. There were grown in this province during the last year for which I have returns, more than 500,000 bushels of grain and 250,000 pounds of tobacco. I suppose it is hardly necessary to call attention to the fact that the camel is not an Arctic animal, and that tobacco is not an Arctic product.

A well-known Englishman, Mr. Grenville Murray, has written a very entertaining, but extraordinarily misleading book, recently published in the Franklin Square Library, entitled the "Russians of To-day." In this book, two chapters are devoted to the "horrors" of Siberian exile. Writers upon exile "horrors," as a rule, carefully avoid telling their readers where these "horrors" are to be found; and, if closely pressed with questions, they adopt the ingenious device of the sea-captain, who was not very

strong in navigation, and who, upon being asked by a passenger where the ship was, spread his huge open hand out on the chart, so as to cover 40,000 or 50,000 square miles, and said, "Somewhar about thar." So the dealers in exile "horrors" point to a country which is 2,500 miles wide and nearly 6,000 miles in extreme length, and say the exile "horrors" are somewhere about there.

Mr. Murray, however, is more definite. On page 26 of chapter 26 of the Harper's edition of his book, Mr. Murray says: "In those terrible regions beyond Tomsk, and still farther, beyond the Yenesei, winter prevails during nine months of the year, and for twelve weeks of that time the days are scarcely six hours long." Just for the gratification of a natural curiosity, let us take a look at the statistics, published by the Imperial Geographical Society, of this "terrible region beyond Tomsk and the Yenesei."

The country which lies next to Tomsk and the Yenesay, on the east, is the Government of Yenesayisk. On the last year for which I have statistics the Government of Yenesayisk contained more than 1,300 cities, towns, villages and settlements, which had, in the aggregate, a population of 313,352. There were within the limits of the Government 359 churches, cathedrals and places of worship, including 106 built of stone. Among them were a Roman Catholic church, a Lutheran church and five Jewish synagogues. The Government contained 2,700,000 acres of arable land, and 729,000 acres of land suitable for pasture and the cultivation of hay; 65,000 of the inhabitants were farmers, who sold grain not needed for their own maintenance to the amount of about 1,300,000 bushels per annum. The mines gave employment to 20,000 people, and there were in the Government 124 manufacturing establishments. The domestic

animals owned in the Government were 272,000 horses, 240,000 cattle, 290,000 sheep and 90,000 hogs.

But perhaps the "terrible region" to which Mr. Murray refers lies still farther to the eastward. The next Government east of Yenesayisk is that of Irkootsk. On the last year for which I have statistics the Government of Irkootsk had 776 cities, towns, villages and settlements, containing a total population of 363,375. There were in these 776 cities, towns, villages and settlements, 240 churches, monasteries and cathedrals, including 48 built entirely of stone. The inhabitants of this Government owned 100 camels, 90,000 hogs, 214,000 horses, 316,000 cattle and 372,000 sheep. They raised in the year under consideration 2,730,000 bushels of winter grain, 5,460,000 bushels of spring grain and 1,100,000 bushels of potatoes. There were in the Government 169 manufacturing establishments, with an annual output of products valued at 3,525,386 silver roobles.

Such is Mr. Murray's "terrible region beyond Tomsk and the Yenesei." I wonder what he would call a good region.

Another English writer refers to this territory as a "climatic hell" prepared for Russian exiles. I do not think the comparison is a very successful one, because a "climatic hell," according to all the rules of analogy, would be a very hot country, and not a very cold one. However, I will not be hypercritical. Writers who are as careless as Mr. Murray and Mr. Duncan about their facts cannot be expected to observe strict accuracy in their metaphors. In this "climatic hell" of Eastern Siberia the Russian botanist Toorkhanik of collected more than a thousand different species of flowering plants. In the same region the scientific expedition sent out by the Imperial Geographical Society, and

known as the Olekminsk-Vitimsk expedition, collected in the summer of 1866 no less than fifty-seven different species of singing birds, including seven varieties of nightingale. To this "climatic hell" of Eastern Siberia the red-throated nightingale comes as early as the 9th of April. It would seem to show very bad judgment on the part of the birds, but it must be remembered that they are unable to read the accounts published in the English newspapers of the "horrors" of the climate.

The statistics which I have given you of the climate and productions of Southeastern Siberia I have taken from the Transactions of the Imperial Geographical Society of Russia, and from statistical and scientific papers and books published under its auspices and with its authority. It is almost unnecessary to a say to a sister geographical society in America, that the statements of the Russian society are to be received with implicit trust.

Having corrected, as I hope, to some extent your ideas of Siberia, I will return to the exiles. All the exiles to Siberia are divided into two great classes; first, *katorzhnee*, or exiles sentenced to hard labor for a term of years; and, second, *seelnee*, or exiles who are simply banished. The first class I shall, for the sake of convenient distinction, call convicts, and the second class colonists. The colonists outnumber the convicts in the proportion of twelve to one, or, in other words, twelve men are sent to Siberia as compulsory settlers, for every one who is sent there and kept at hard labor. I will take up first the colonists, who are simply banished.

Banishment to Siberia is graded in various ways, according to the severity of the punishment which the Government desires to inflict. In the first place, it is divided into

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"near" and "remote." "Near" banishment is exile to one of the Siberian Governments, such as Omsk or Tobolsk, which lie near to the Russian frontier; and "remote" banishment is exile to one of the East Siberian Governments, such as Irkootsk or the province of the Trans-Baikal.

All the exiles go to the same zone, or belt of country, namely, the fertile zone of South Siberia, but some go one thousand miles east of the Russian frontier, and some three thousand, and the more remote the place of banishment the more severe is thought to be the punishment. I do not think myself that it makes much difference, so far as the comfort and business prospects of the exile are concerned, whether he goes to the Western Governments or to the Eastern. The climate of the latter is a little more rigorous than that of the former, and the country east of Lake Baikal is less thickly settled than that between Lake Baikal and the Oorals; but, on the other hand, the exile to Eastern Siberia has the advantage of a somewhat better social position than the exile to the Western Governments, for the reason that in the latter there is a strong and growing prejudice against exiles and exile labor.

Aside from the distinction which is made between "near" and "remote" banishment, exile is further graded by means of restrictions put upon the colonists' movements. Some colonists have the freedom of a whole Government, while others are restricted to a particular *ooyayzd* or district of that Government, to a particular *okroog* or circle, or to a single settlement. All are required to report themselves at stated intervals to the local authorities. This is all, I think, that it is necessary to say about the distribution in Siberia of the colonists.

The second great class of exiles, namely, the convicts, who are mostly murderers, burglars and highway robbers, are all sent to Eastern Siberia. Some go to the Government of Irkootsk, some to the province of the Trans-Baikal, and some to the island of Sakhaleen. All are kept at hard labor under guard.

The next question which arises is, how are these convicts and colonists transported to their places of destination? The popular idea of exiles is well represented by the picture in the old geographies, showing a band of handcuffed men, chained together, walking wearily over a great plain of snow, with fierce mounted Cossacks on each side punching them up with long spears. Every feature of that picture conveys a wrong idea. Exiles do not go to Siberia on foot —at least in winter—they are not handcuffed, or chained together, or punched up with spears. On the contrary, they travel in large two or three-horse wagons or sleighs, they have the unrestrained use of their limbs, and, so far as my observation goes, are well-clothed, well-fed and well-treated. In summer, exiles are taken by rail to Neezhnee Novgorod; thence by steamer down the Volga and up the Kama to Perm; thence by rail across the Oorals; thence by steamer again down the Irtish and up the Ob and the Tom to Tomsk, and thence they travel by wagons or on foot across the remainder of Siberia to their places of banishment.

Most of the exiles are sent to Siberia in summer, both because the expense of their transportation at that season is less, and because the journey at that season involves less hardship. They go, however, even in winter, and on my way from Irkootsk to the Russian frontier in December, I met between six and eight hundred of them. All were

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riding in comfortable three-horse sleighs, with the exception of a single party, who were on foot.

What the reason was for this solitary exception I do not know, but that there was a satisfactory explanation of it I do not doubt. Very likely there were not enough horses at one of the stations, and the exiles, as the weather was not very severe, preferred to walk ten or twelve miles to the next station rather than wait. They did not, at any rate, seem to be in any distress, and nobody was whipping them or punching them up with spears. I saw in Siberia hundreds of Cossacks, but I have yet to see the first one armed with a lance or carrying a whip larger than a common English riding-whip. In this particular instance the Cossacks were on foot with the exiles.

The journey of the exiles to their destinations occupies from one to four months, according to the nearness or remoteness of the places to which they are banished. Upon their arrival, they are furnished by the Government with an allowance for their support until they are able to support themselves, and they begin at once their new career. Some hire themselves out as laborers in the mines or the manufacturing establishments; some, who happen to have a trade, seek employment in it; some take service under large contractors or transportation companies as drivers or teamsters; some begin cultivating the soil; and some shirk all work and watch for a good opportunity to make their escape or to commit another crime.

The industrial and manufacturing statistics of Southern Siberia, which I have already given you, are amply sufficient, I think, to prove that a man need not suffer there for want of work. If not, I have plenty more. The transportation business of Siberia, alone, furnishes employment

to a perfect army of men. There are in the South Siberian Governments of Tobolsk, Omsk, Tomsk, Yenesayisk and Irkootsk, more than 2,000 merchants, and the merchandise transported annually over the great road between Irkootsk and the Russian frontier exceeds in value $20,000,000. The through Chinese trade alone, in the last year for which I have statistics, gave employment to 31,153 wagons and sleighs, which carried 25,900,000 lbs. of goods.

There were three steamers and a multitude of ships on Lake Baikal (which, by the way, is 400 miles long); there were 260 ships on the River Lena, which carried to and fro merchandise valued at more than 2,000,000 roobles; and there were steam navigation companies both on that river and on the Amoor.

To take another branch of industry, there were in the single province of the Trans-Baikal 46 gold placer mines, which washed annually 37,000 tons of earth, and produced from five to 7,000 lbs. of gold bullion. In addition to gold, there have been taken out of the mines of this single province, since their discovery, 958,000 lbs, or nearly 500 tons, of pure silver.

In this review of the trade, industry, and productions of South Siberia, I have not touched at all the Governments of Omsk and Tomsk, which are the richest in the country, but have confined myself for the most part to what Mr. Murray calls "that terrible region beyond the Yenesei." I think it must be evident that in such a country as this, an exile who is willing to work can support himself without serious difficulty.

As for the political exiles, who are represented as being the particular objects of the Government's brutal cruelty and barbarity—the high-born ladies and gentlemen who

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are supposed to work in the quicksilver mines, under the lash, until their hair and all their teeth fall out—I happen to know some of them personally, and to have been hospitably entertained at their houses. Among the letters of introduction which were given to me by Russian friends and acquaintances in Northeastern Siberia was one from a gentleman in Geezhega to his brother, a political exile living in Omsk. I stopped purposely one day in that city to present this letter, because my relations with the exile's family had been such that I felt sure he would give me his confidence and tell me the truth about the exile system.

Omsk, where this gentleman was living, is a city of 20,000 inhabitants, and is situated in one of the most fertile Governments in Siberia. It is the centre of a large and important trade, and includes among its citizens 452 merchants. It has ten churches and cathedrals, including a Lutheran church, a Mohammedan mosque and a Jewish synagogue. It has a public library, a female seminary, a military school for boys, a Mohammedan school and twenty-two manufactories. It is, in short, a thriving, enterprising, prosperous city, where one may obtain all the comforts and most of the luxuries of life.

In this city was living the Polish exile to whom I had a letter of introduction. He had taken up for support after his banishment the profession of photography, and although I do not know how profitable he found it, everything about him indicated a successful and prosperous man. He was living with his family in a well-built and convenient house, with carpets, mirrors, pictures and all the comforts of civilized life. He was dressed in broadcloth, had the appearance of being well fed, and indeed, personally, looked much more reputable and prosperous than I did. He talked with

me very freely about the Russian Government and the exile system. Of the latter he disapproved, and of the former he spoke with great bitterness; but he could not refer me to any instances of cruelty or barbarity which had come under his own observation. He thought that he had been arbitrarily, despotically and unjustly exiled; but he admitted that within the limits of the Government to which he had been banished he could do pretty much what he liked, and was living a fairly satisfactory life.

I will not undertake to maintain that all the political exiles in Siberia are treated as well as this gentleman in Omsk; I presume not. Under the head of "State criminals" are classed "terrorists" as well as Polish intriguers, and if a "terrorist" enters into a conspiracy to throw a dynamite bomb under the carriage of the Chief of Police, or to do any other act which contemplates murder, I presume he suffers, upon conviction, the punishment which the law prescribes for assaults with deliberate intent to kill, viz.: exile, with hard labor. I will say, however, that the case of this gentleman in Omsk is by no means exceptional, even within the range of my comparatively limited experience, and many parallel instances are cited by dispassionate and even by hostile observers.*

Only one class of Siberian exiles remains to be considered —the *katorzhnee*, or convicts. On the last year for which I have statistics—the year 1876—there were in the Russian empire 10,109 hard-labor convicts, and of this number 8,233

* See "Down the Amoor," by Perry McD. Collins, pp. 137 and 138; "The Progressive Movement of Russia into Northern and Eastern Asia," by M. I. Venyookof, p. 228; and "The Reformatory Influence of Russian Exile," by N. M. Yadrintsef, *Dyello*, January, 1871.

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were in Eastern Siberia. The labor which Siberian convicts are required to do is of various kinds, but it is, as a rule, open-air work. Some build forts, erect houses for government purposes, or throw up lines of entrenchment on the southern frontier; some work on the roads, some cut timber, and some labor in the mines. It must not be forgotten, however, that these hard-labor convicts are men whom, in America, we should send to a State prison for life, or hang; that more than nine-tenths of the Siberian mines are mere surface placers, and that nineteen-twentieths of the men who work in them are free laborers who work for wages.

Most of the government mines in Eastern Siberia have recently passed into the hands of private individuals and corporations, the Government having found it unprofitable to work them. In former years there were about 3,000 convicts in the mining district of Nerchinsk, north of the Amoor, but in 1867 these mines were sold, and the government convict establishment was broken up. The only convict mines in Eastern Siberia now, so far as I know, are the mines of Kara on the Shilka River, a tributary of the Amoor, and the coal mines of Dooy, or Dui, on the island of Sakhaleen.

As I have never visited these mines, I shall have to quote the testimony of others with regard to the condition of their convict laborers. The Rev. Mr. Lansdell, an English missionary who has recently returned from a trip through Siberia, visited the mines of Kara about two years ago.

These mines are situated in the province of the Trans-Baikal, of whose climate and productions I have already given you some account. Mr. Lansdell says: "I spent some time at Kara on the Shilka, and had ample oppor-

tunities of seeing the place well. I went to the mines, and saw the men at their work, which is all done on the surface, and which resembled the labor of navvies when making a cutting—stones and earth having to be carted away, and put in a machine to be washed. Their hours of labor were from six in the morning to seven at night, with an hour or two's rest at dinner, and this only in the summer-time, because in the winter the ground is frozen, and they have little or nothing to do. Free laborers in the mines, I noticed, continued to work after the convicts left, and I learned that convicts may sleep from nine P. M. to five A. M. in summer, and in winter from seven P.M. to seven A.M. The food per week given to a hard-labor convict is nearly double that given to a convict in England. The number of indulgencies also accorded to a prisoner at Kara, such as receiving visits from relatives, or money from friends, correspondence by letter, and remission of labor, is largely in excess of similar privileges accorded to convicts in England."* The account given by Mr. Collins of the treatment of the convicts in the mines of Nerchinsk, before the latter were abandoned by the Government, is to the same effect.† It thus appears that the lot of a Russian convict, even in a Siberian mine, is no worse than that of convicts in Europe and America generally.

I would not have it understood, however, that the Russian penal system has always been what it now is, or that Siberian exile has always been exempt from the cruelty and the abuse of power which have characterized penal administration in other countries. Unfortunately, this is not

* "Through Siberia," by Henry Lansdell, Contemporary Review, Oct., 1881.

† "Down the Amoor," by Perry McD. Collins, page 126.

the case. The history of the working of the exile system during the past half century is full of instances of injustice, cruelty and oppression, growing out of the unchecked abuse of power by individual officers; but this is no more than may be said of the penal administration of every country. There is hardly an instance of cruelty referred to in Mr. Murray's book, or even in Maximof's "Siberia and Hard Labor Exile," for which a parallel may not be found in the history of American State prisons, to say nothing of the history of the transportation of convicts to Australia and Van Dieman's Land. If these abuses of authority in English colonies and in America do not prove that the Government under which they occur is a brutal and half barbarous one, neither do similar abuses in Russia prove that the Government of that country is brutal and semi-barbarous.

It may be said that in America and England attention is called to such abuses of authority by a free press, and that in Russia there is no check of this kind upon official action, because the Government does not permit its acts or those of its officers to be questioned or criticised. This is another popular misapprehension. Some of the severest and most uncompromising attacks which have ever been made upon the exile system have been made by Russians in Russian periodicals. The books of Maximof, Yadrintsef and Venyŏokof, are all openly hostile to the exile system, and Maximof's "Siberia and Hard Labor Exile," in particular, is a perfect encyclopedia of administrative abuses and instances of cruelty and oppression. There does not exist in any other language such a collection of what may be called Siberian "horrors," as that contained in this single volume; and yet it was written by a Russian,

published openly in St. Petersburg, and bears upon its title-page the words "Authorized by the Government Censor." It is hardly fair, therefore, to say that the Russian Government does not permit criticism of its own acts. If it allows such statements to be printed and circulated as are contained in the books of Maximof and Yadrintsef—statements which are not only prejudiced and one-sided, but in many cases untrue—I am at a loss to know what it would prohibit and suppress. Mrs. Helen Hunt Jackson's "Century of Dishonor" is not a severer arraignment of the policy of the United States in its dealings with the Indians than Maximof's "Siberia and Hard Labor Exile" is of the policy of the Russian Government in dealing with its criminals.

Opposition to the exile system in Russia rests chiefly upon facts which are not known, or at least are not taken into account, by writers on the subject in other countries. In England and America, Siberian exile is condemned because it is thought to be a cruel and unusual punishment. In Russia, it is opposed because it has a demoralizing effect upon the Siberian population. In the one case it is regarded from the point of view of the criminal, and in the other from the point of view of society. As the inhabitants of Siberia, and especially of the West Siberian Governments, become more and more wealthy, prosperous and civilized, they object more and more strenuously to the colonization of criminals in their towns and villages. "We admit," they say, "that it is essential for the protection of society in European Russia, that the criminal should be removed from there, and very desirable that he should, if possible, be reformed; but we do not want him removed to our villages, and reformed entirely at our ex-

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pense. What have we done, that we should have eight or ten thousand thieves, forgers, drunkards, counterfeiters and vagrants turned loose at our very thresholds every year?" Then the Eastern Governments of European Russia, such as Perm, Orenburg and Kazan join in the protest, on the ground that their towns and villages are overrun by criminals who have made their escape from Siberia, and that the aggregate of crime within their limits is in consequence enormously increased. They say to the Government, "You collect criminals from all parts of the empire, transport them across the frontier, and then turn them loose only a few hundred miles from our eastern borders. A large proportion of them make their escape, and straggling back in a destitute condition, they quarter themselves upon us. We are as much entitled to protection as the Central, Southern and Western Governments from which these criminals were originally taken. If you insist upon sending thieves and burglars to Siberia instead of shutting them up in penitentiaries, we beg you to send them far enough to the eastward, so that they cannot straggle back across the frontier to prey upon us."

As a result of these complaints, the Russian Government has recently been sending more of its criminals to the thinly-populated regions of Eastern Siberia, and less to the Western Governments of Omsk, Tomsk and Tobolsk. In time, however, the same complaints and remonstrances which now come from the Western Governments, will come from Irkootsk, Yenesayisk and the province of the Trans-Baikal, and then the exile system will have to be either abolished or so changed as to relieve Siberian society from its burdens.

I have only a few words to add, by way of a summing up,

to this long account of Siberian exile, and I will put those words in the form of three conclusions: 1. Whatever exile may have been in the past, it is not now, in any just sense of the words, a cruel or unusual punishment. On the contrary, it is a more humane punishment than that inflicted upon criminals generally by other European States; for the reasons, that it does not necessarily separate the criminal from his family, it does not deprive him of the fruits of his labor, if he is willing to labor, and it holds out to him an opportunity and an inducement to reform. 2. Regarded from the point of view of society, Siberian exile is a great and a growing evil; for the reasons, that it tends to demoralize the population of the country to which the criminals are sent, it fails to afford adequate protection to life and property in European Russia, on account of the facility with which criminals make their escape, and return to their homes, and it is beginning to lose the restraining and deterring influence which it once had upon the criminal classes. 3. Since the exile system works to the advantage of the criminal, and indirectly of the State, by making it worth the criminal's while to reform; and since, on the other hand, it works to the disadvantage of society, and especially of Siberian society, by throwing upon the latter in every case the risk of the reformatory experiment, its future existence will depend upon the result of a balance struck between its evils and its benefits. In my judgment, the former already outweigh the latter; and the preponderance of evil will become greater and greater as Siberia and European Russia increase in population, in wealth, and in social and material well-being. It is probable, therefore, that the exile system will eventually be abolished in Russia, as the transportation system has been in England, and for

substantially the same reasons. In both countries it has been found that while the system of removal benefits one part of the Empire, it demoralizes another; and that while it reforms a certain number of criminals who could not perhaps be reformed in any other way, it sows the seeds of crime broadcast in the virgin soil of the country to which the criminals are sent.

It also retards the development and civilization of the penal colony in another way, by discouraging emigration to it. The fact that residence in Siberia is made by the law a punishment for crime, gives to such residence a bad reputation. The would-be emigrant argues, that if life in the province of the Trans-Baikal is so hard as to make it a suitable punishment for burglary, it is too hard for a free peasant; and that, furthermore, the rewards of honest industry in a penal colony must be greatly reduced by the competition of convict labor, as well as rendered insecure by the disproportionately large criminal class.

Siberian exile, therefore, which was originally resorted to as a means of settling and populating a rich and undeveloped country, is now beginning to act as a restraint upon such settlement and population, and as a heavy burden upon the civilization and social order which have already been established in the Western and Central Governments. For these reasons, and others of less importance which might be assigned, it seems to me probable that within the next quarter of a century, the exile system will either be greatly modified or entirely abolished.

It is impossible at the present time to close a lecture upon Siberia, without making some reference to the unfortunate party of American explorers who have recently been thrown upon the desolate Arctic coast of that vast territory. I am

not sure that I can add anything to what you already know with regard to the *Jeannette* and her survivors, because I have not had access to any exclusive sources of information, but have obtained my knowledge of the facts from the telegrams which have been given to us all through the newspapers. I am, however, familiar with the country where the survivors of the *Jeannette* now are, and I can tell you what I think with regard to the chances of escape of the boats' crews commanded respectively by Lieut. De Long and Lieut. Chipp.

The steamer *Jeannette* was last seen in open water on the 3d of September, 1879, a short distance east of Wrangell Land and south of Herald Island. Three days later she entered the ice, and from that time until the summer of 1881 she drifted helplessly to the northwestward in the pack. On the 12th of June, 1881, she was crushed by the ice, and sank in north latitude 76° 15′, and east longitude 156° 20′, about 150 miles northeast of the islands of New Siberia. The crew started for the Asiatic coast over the ice with three boats and all the provisions they could carry. After a journey of great difficulty and hardship, which occupied eighty-six days, they reached open water near Semyonofski Island and sailed together for the mouth of the Lena River. In a heavy northeast gale the boats were separated. The whaleboat, under command of Engineer Melville, made the land at Cape Barkin on the 17th of September, and her crew soon afterward found a small native settlement near the eastern mouth of the river. The first cutter, under command of Lieut. De Long, made the coast about the same time, but at a point farther to the westward and nearer to the middle of the Lena delta. The second cutter never has been heard from.

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Nearly six weeks elapsed before any news from Lieut. De Long's party reached the crew of the whaleboat, who in the meantime were endeavoring to open communications with a small village called Booloon, situated on the Lena about a hundred miles above the delta. On the 26th of October, Noras and Ninderman, two of the crew of the first cutter, who had been sent by De Long after help, were found in an exhausted condition by three wandering natives and carried to Booloon. There, on the 2d of November, Engineer Melville found them, and learned from them that Lieut. De Long and his men had landed safely at one of the northern mouths of the river, and were making their way slowly southward on foot in search of a settlement. They were badly frost-bitten, and, on the 9th of October, when Noras and Ninderman left them, were suffering for want of food.

On the 5th of November, Engineer Melville, with a small party of natives, started on dog sledges in search of his suffering comrades. He succeeded in getting on their track, found four letters left by them in their deserted camps, and recovered a number of books and instruments which they had abandoned; but he could not find the men themselves, and after tracing them to what is known as "the wilderness," a barren toondra on the western side of the river, he was compelled by want of food to return to Booloon. About the 1st of December he started for Yakootsk to report and get assistance, and since that time nothing has been heard from the mouth of the river.

Four months and a half have now elapsed since Noras and Ninderman left Lieut. De Long's struggling, suffering, starving party, on the edge of the "wilderness" north of Booloon. Up to the 1st of December, when Engineer

Melville left the mouth of the river, we know that they had not been found. Have they been found since that time? I fear that the answer must be in the negative. If they had reached any native settlement on the North Siberian coast, at any time previous to the 1st of January, we should now be in possession of information to that effect, since a messenger starting on that day from the mouth of the Lena would before this have arrived at Irkootsk. The question then arises, "Could Lieut. De Long and his men live out on a Siberian toondra until the first of January, or even until the first of December, without other food than that which the toondra affords?" Probably not. If they were well and strong and able to walk long distances in search of game, there is a possibility that they might; but in their enfeebled condition, frost-bitten, exhausted and without proper clothing, they could hardly live through even the first month of the long Arctic night. I greatly fear that the last chance of saving Lieut. De Long's party was lost when Engineer Melville and the natives turned back at the edge of the "wilderness."

For Lieut. Chipp and the crew of the second cutter there is, it seems to me, still less hope, because we do not even know that they reached the coast alive. If they did, their circumstances can hardly have been better than those of Lieut. De Long and his men, and as month after month passes without bringing tidings from either party, the probability that either party has reached a place of safety grows less and less strong.

In view of the disastrous results of this well-equipped and probably well-managed Arctic expedition, the questions are likely to be asked again: "Of what use is Arctic discovery? What has ever been gained by Arctic explora-

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tion at all commensurate with its cost in money, suffering and life?" The questions are old ones, and are easily answered. The whale-fisheries of Spitzbergen were discovered by an Arctic expedition, and at the height of their prosperity they gave employment to two hundred ships every year. The whale-fisheries of Baffin Bay were also discovered by an Arctic expedition, and they, too, have added enormously to the world's wealth and comfort. As a direct result of Arctic exploration, more money was made in the Arctic regions in a single year during the prosperity of the Spitzbergen fisheries than was expended upon Arctic expeditions during that entire century.

As to the scientific and indirectly practical results of Arctic exploration, I will quote an authority whose words carry more weight than mine. Prof. Loomis, of Yale College, says: "The vast extension of the commerce of the world in recent times, and its increased security are due in no small degree to more accurate information respecting the physics of the globe, including such subjects as the mean direction and force of the prevailing winds, the laws of storms, the use of the barometer in giving warning of approaching violent winds, the surest mode of escaping the violence of a gale when overtaken by it, the most advantageous route from one part of the globe to another, the direction and velocity of the currents in every ocean, the variation of the magnetic needle in all latitudes, and its changes from year to year, together with many other problems; and most of these investigations have been greatly facilitated by observations made within the Arctic regions. There is scarcely a phenomenon relating to the physics of the globe which can be fully understood without a knowledge of the phenomena in the region around the

pole; and, generally speaking, the poles and the equator are more important as stations of observation than any other portions of the earth's surface."

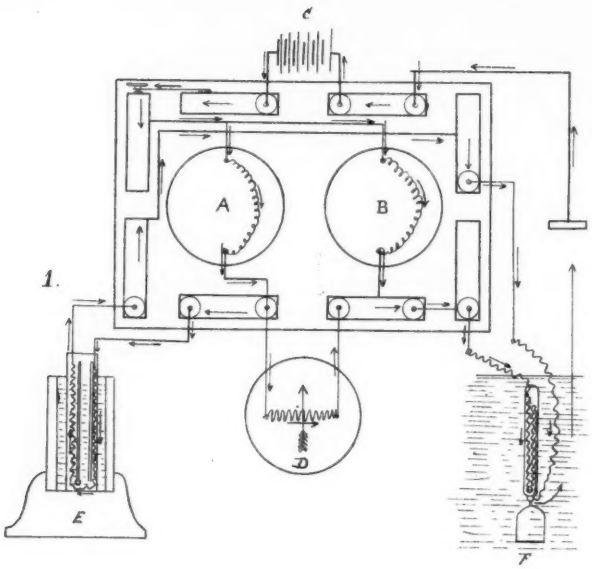
General Hazen, the Chief Signal Officer of the United States Army, in his last annual report to the Secretary of War, said: "The progress made by this office in the study of meteorology has, for several years past, confirmed the conclusion that, owing to the very mobile nature of the atmosphere, the changes taking place on one portion of the globe—especially the Arctic zone—quickly effect regions very distant therefrom. The study of the weather in Europe and America cannot be successfully prosecuted without a daily map of the whole northern hemisphere, and the great blank space of the Arctic region upon our simultaneous international chart has long been a subject of regret to meteorologists."

But it is said that the loss of life in Arctic exploration is very great. This is only an erroneous popular impression. The Secretary of the Dutch Geographical Society has compiled a list of the deaths in thirty-one Arctic expeditions sent out by England and America since 1841, from which it appears that the annual death-rate of these expeditions was only one and seven-tenths per cent.—a death rate considerably below that of New York City and Washington, and far below that of our merchant marine.

Deaths in the Arctic regions are not frequent or many; but circumstances attract to them an extraordinary and disproportionate amount of public attention. This very fact gives to the sufferings and the achievements of Arctic explorers a significance and a moral value which the sufferings and achievements of other men, under other circumstances, do not have. Arctic exploration is a field upon

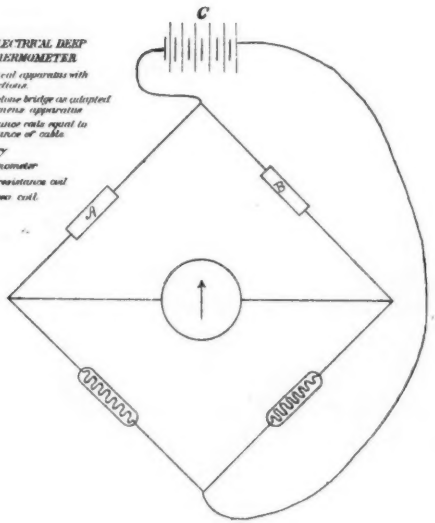
which are exhibited in the sight of all the world some of the highest and noblest attributes of manhood.

A poor, obscure, insignificant man may bear physical suffering as uncomplainingly and meet death as bravely as did James A. Garfield; but he can never be, to the world, the magnificent example of patient courage and silent heroism that Garfield was, because the world, which watched by Garfield's bedside, does not even know of the obscure man's existence. So the crew of a little fishing smack, wrecked in winter on the coast of Newfoundland, may struggle bravely, suffer nobly and die heroically; but their struggles, their sufferings and their death occupy only twenty lines in the crowded shipping column of some great metropolitan newspaper. Their bravery and their heroism, as examples, count for nothing, because the world knows nothing of them. But when an Arctic expedition sails, the eyes of all the world follow it; and when a little band of gallant men, like the survivors of the *Jeannette*, are turned out of their crushed ship in the middle of the Arctic Ocean; when they fight their way through five hundred miles of ice-choked sea to a barren and frozen coast; when, exhausted, frost-bitten, starving, they struggle on southward across a snowy desert, leaving brave, cheerful letters behind them in their deserted camps; when the strong lend their strength to the weak, and guide the uncertain footsteps of those who are almost gone; when one of them gives up, as did Mr. Collins, all his own chances of escape, in order that he may stay behind with a dying comrade; when, after thus fighting bravely, suffering patiently, struggling nobly and standing by one another, they die at last with unshaken fortitude, they raise the world's standard of heroism for all time.



SIEMENS ELECTRICAL DEEP SEA THERMOMETER

1 Electrical apparatus with connections.
2 Wheatstone bridge as adapted to Siemens apparatus
A B Resistance coils equal to resistance of cable.
C Battery
D Galvanometer
E Dock resistance coil
F Deep sea coil.



THE GULF STREAM.

ADDITIONAL DATA FROM THE INVESTIGATIONS
OF THE
COAST & GEODETIC STEAMER "BLAKE,"

BY
COMMANDER J. R. BARTLETT, U. S. N.,
Assistant C. & G. Survey.

My previous paper, read before this society, told of the source of the Gulf Stream, beginning with the equatorial current at Barbadoes, and following it in its course through the Gulf of Mexico to the Straits of Florida. Our work was over entirely new and unexplored ground, and I was not hampered with any theories, nor had there been anything written on the subject.

The "Gulf Stream," that body of warm water flowing through the Straits of Florida and along our coast, which is said by many to influence the climate of England and Northern Europe, is a subject on which much has been written, each writer solving the question in a manner satisfactory to himself. I shall, therefore, treat the main subject with hesitation, merely giving my deductions from the actual facts obtained by the *Blake's* party, and, if not throwing much new light on the subject, I will endeavor, at least, to correct a few popular errors.

A President of the Royal Geographical Society once said to that body: "The Gulf Stream was almost as great a nuisance as Macaulay's New Zealander, or the German who evolves things from the depths of his consciousness. There

are certain remarks which nobody ever makes without a certain air of superior wisdom, and the man who affected familiarity with the Gulf Stream always seemed to feel himself six inches taller in consequence. I should have real pleasure in learning that the Gulf Stream had been definitely exploded."

After being for three months engaged in crossing and recrossing the Gulf Stream from Jupiter Inlet, Florida, to Cape Hatteras, and obtaining some important facts, I am by no means familiar with this great wonder of the ocean, and will not, therefore, venture to claim the additional six inches mentioned by the learned geographer. Such facts as I have obtained I will lay before you, and in the near future hope to contribute such additional information as will make all familiar with the Gulf Stream.

The *Blake* reached Cape Canaveral May 22d, 1881. My instructions from Mr. Patterson, Superintendent of the Coast Survey, were to run lines normal to the coast every sixty miles, beginning at Jupiter Inlet, Florida, and extending to Currituck, North Carolina.

On these lines I was directed to take soundings at distances of five miles, with bottom and surface temperatures, also frequent series of temperatures at various depths. The temperature of the water from the surface to thirty fathoms was especially required to determine the bifurcation of the stream into warm and cold bands as had been previously reported. Every fact possible was to be obtained in regard to the boundaries of the stream, and every line was to be completed before beginning another. I found it more practicable to do only one class of work at a time, and, with the approval of the superintendent, con-

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fined myself to soundings with bottom and surface temperatures—the serials to be carried on at another time.

I will give some account of the first lines; although they explain themselves in a study of the data given.

On May 29th we anchored a few hundred yards from Memory Rock, Little Bahama Bank, in four fathoms of water. Memory Rock is a mass of coral about one hundred feet long by fifty feet wide, its highest part being fifteen feet above the water line.

On May 30th a line of soundings was run across the stream to Florida.

To run the distance (48 miles), from the rock to Jupiter Inlet light, with the time necessary for soundings at every five miles, would take nine hours. Three miles per hour were allowed as an *average* current, and a course was steered for a point 27 miles south of Jupiter Inlet, this latter point being almost due west from our starting point.

Running by patent log 6.1 miles between soundings would bring the soundings five miles apart on the true line. We left Memory Rock so as to bring the noon position as near the centre of the stream as possible. The shore was made about two miles to the southward of Jupiter Inlet, the sea being smooth, with a light S.E. breeze. To our noon position we had a northerly current of from 1.5 to 2.7 knots per hour; from the noon position to sighting the light, the current was over five knots per hour, and thence 3, 2 and 1 knots, until we anchored. We were exactly nine hours in running the line. In addition to soundings every five miles with surface and bottom temperatures, other temperatures were taken at short intervals to a depth of thirty fathoms. Again we crossed to the Bahamas and re-

turned to Florida, these latter lines being principally for observations of temperatures. We found the same average current, but the strength in the axis of the stream was near the east or west shore, according to the direction of the wind.

The temperatures below the surface were taken with the Miller-Casella thermometers. The electric apparatus which had been placed on board before sailing, could not be used, owing to the non-arrival of an ice machine which had been ordered from France.

This line, called A, was the only one where serial temperatures were taken, it being thought best to confine our work to soundings until such time as we should be able to use the Siemens electric apparatus.

The soundings across from Memory Rock, with surface and bottom temperatures, were as follows:

At anchorage near Memory Rock, in 4 fathoms water, surface 78°, bottom 78°.

5 miles	Surface,	81½°	Depth,	294	fathoms	Bottom,	56½°
4½ "	"	81½°	"	347	"	"	52°
4½ "	"	81½°	"	395	"	"	45°
4½ "	"	82½°	"	439	"	"	44°
5½ "	"	83°	"	416	"	"	44°
5 "	"	83°	"	341	"	"	44°
5¾ "	"	82½°	"	250	"	"	50°
5 "	"	80°	"	176	"	"	50°
5¼ "	"	80°	"	95	"	"	57°
2¼ "	"	80°	"	31	"	"	71°
2¾ "	"	80°	"	10	"	"	78°

2¼ miles to shore.

The area of this cross section is 429,536,240 square feet; and, assuming the velocity at three knots, the delivery would be 51,028,905,312,000 gallons per hour.

The lines of soundings were continued to Currituck, N. C. On two occasions we crossed previous lines and obtained exactly the same depth to a fathom.

The work of the season gives very interesting data in regard to the physical features of the bottom of the ocean over which the Gulf Stream flows. Instead of a deep channel in the course of the stream, as reported by Lieuts. Maffit and Craven, and published in the Coast Survey reports by Prof. Bache, our later soundings show an extensive and nearly level plateau, extending from a point to the eastward of the Bahama Banks to Cape Hatteras; off Cape Canaveral nearly 200 miles wide and gradually contracting in width to the northward until reaching Hatteras, where the depth is more than 1,000 fathoms within 30 miles of shore. This plateau has a general depth of 400 fathoms, suddenly dropping off on its eastern edge to over 2,000 fathoms.

The soundings in the full strength of the current were all taken with the 60-pound shot sinkers, each being detached on reaching bottom. The time allowed for the sinker to reach the bottom was less than one minute to each one hundred fathoms in depth. Most of the soundings on each side of the stream, when not in the current, were taken with a 36-pound lead on the sounding wire, the lead being reeled back each time. Specimens of the bottom were obtained at nearly every sounding; the only failure was in using the lead and Stellwagen cup, in which case, while waiting for the bottom thermometer to register, the specimen was

washed out by the motion of the vessel. Enough specimens were obtained, however, to give a very good idea of the bottom where the lines were run. The course of the Gulf Stream can be traced by a study of these specimens. On each side of the stream the cylinder brought up ooze, but in the strength of the current the bottom was washed nearly bare, the specimens being small pieces of disintegrated coral rock. This bare portion was very hard, and the sharp edge of the brass cylinder came up indented and defaced. From Jupiter Inlet, with the exception of the bare part mentioned, the specimens were a light-colored ooze, composed of Pteropod shells, with a mixture of coral sand. Off Charleston, where the plateau has less depth than to the southward, the bare section extended the whole width of the stream. The Pteropod ooze extended only to Charleston. To the northward of that point the bottom specimens were Globigerina ooze, of a dark greenish color.

In the Caribbean Sea and Gulf of Mexico the bottom is always Pteropod ooze. These Pteropods are brought along by the Gulf Stream. Sir Wyville Thomson reported most of the Northern Atlantic bed to be Globigerina ooze, and as far as off the George's banks the *Blake* always found this latter. The fact of finding this ooze off Hatteras, and its gradual diminution, and at last its total absence to the southward, would tend to show the limit of the Arctic current. The Globigerina were not found anywhere on the plateau to the southward of Charleston. The Gulf Stream has for its western bank the 100-fathom curve. It has a depth of 400 fathoms as far as Charleston, where it is reduced to 300 fathoms ; but the Arctic current has for its bank the 1,000-fathom curve, which is quite close to shoal water, from the George's banks to Hatteras. These speci-

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mens of the bottom seem to me to throw very important light on the circulation. From them alone we can state as a fact that the Arctic current does not extend along our coast below Hatteras; but at this point the Arctic current, with its colder and heavier waters, in following its bank the 1,000-fathom curve meets the Gulf Stream and goes under it, following the outside of the plateau towards the equator. In addition, the few temperatures that were obtained at the bottom confirm the same fact.

Many have met icebergs advancing against the Gulf Stream, carried along by their immersed section, which is in an opposite current coming from the northward. A branch of the Arctic current which brings these icebergs south, tends to the westward after rounding the Newfoundland banks and flows along our coast as far as Hatteras.

My instructions laid particular stress on the temperatures of the surface, and to five fathoms beneath it, in order to show the bifurcation of the Gulf Stream into warm and cold bands. The temperature of the surface water was taken at every mile on all lines by means of an ordinary thermometer. The water for this purpose was drawn over the stern. At every sounding the temperature of the surface was also taken forward by means of the thermometer attached to the hydrometer case, and compared with that aft. Both thermometers were compared with a standard each day.

I was furnished with a diagram, published by Prof. Bache in 1861 to accompany his report on the Gulf Stream, as a guide to me as to what I was expected to find. The surface temperatures obtained by the *Blake* do not show any bifurcation of the Gulf Stream before reaching Hat-

teras. At this latter point I only ran out a few miles, but there were indications of warm and cold bands.

The surface temperatures found in the Stream are much below those generally given by writers, the average temperature in the axis of the stream rarely exceeding 83° in June and July. On one or two occasions the thermometer read as high as 86°, and once 89°, but it was at high noon in a calm. The temperature at five fathoms did not range above the average of 81½°. An increase of temperature of the surface water was found as we entered the current, and the curve was over the higher temperature found at the bottom.

The surface temperature did not indicate a cold wall inside of the stream; and the water inside of the 100-fathom line extending to the shore seemed to be an overflow of the stream, as the temperatures to five, ten, and fifteen fathoms were nearly as high as those found in the stream.

The temperatures at the bottom in the stream at corresponding depths were the same as those found in the Windward passage, and in the course of the current to the Yucatan passage. The average bottom temperature at 400 fathoms in the stream was 45°, and at Charleston, in 300 fathoms, 53°. The temperature at 300 fathoms off the George's bank was found in July to be 40°, and this was the temperature that I found at the same depth just north of Hatteras and of the Gulf Stream.

I have stated that I did not find a cold wall by the surface temperature, but the bottom temperatures give a narrow cold section close to the 100-fathom curve all along the course of the stream; and soon after leaving the Straits of Florida there seems to be a division of the stream, one part

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following the coast, and another branching off to the eastward. Temperatures at varying depths are now needed for a study of the stream. The results of the last work of the *Blake* may be considered as little more than giving the contour lines. In the dredgings made by the *Blake*, we have brought the tropical fauna as far north as Hatteras; but off the Chesapeake, Delaware and Narragansett Bays the specimens were strictly Arctic in the forms of life. I have no doubt in my own mind that the Gulf Stream causes the mild climate of England and the Scandinavian peninsula, and keeps open all the year round the port of Hammerfest, in Norway. I trust that our Government will continue the present investigations until we prove it.

Mr. Wm. H. Dall, Assistant U. S. C. & G. Survey, who has lately been investigating the currents in Behrings Straits, says in his report:

"The chief current of Behring Sea is a motion of cold water southward. This has a superficial stratum above it, which has in summer, when not interrupted by wind, a northerly motion of translation, but is not sufficient either in mass, motion, or consistency of direction, to be entitled to take rank as an ocean current."

Is not this southerly current the Gulf Stream, after a journey around Europe and Asia? But I am wandering a long way from my sounding ground, and must say something of the currents.

I can only give you an account of those found by the course and distance run, and the observations. The directions and velocities are, of course, only for the time we were

actually at a particular part of the stream, and under the existing circumstances of direction and force of the wind. We found that three knots per hour was the general average to allow for the whole stream; this would give a greater velocity at some central point. Between the Bahamas and Florida the average current was exactly three miles per hour, but for a distance of fifteen miles it was as high as 5.4 miles per hour. To the northward of the Bahama Banks, and to the eastward of the stream, there was a slight current setting southeast. We found the direction of the current in the stream very much affected by the wind, sometimes inclining it to the east, then to the west.

In the latter part of June we were hove to, some fifty miles east of the Gulf Stream, off Charleston, when we experienced a current of three knots per hour setting southeast, the wind blowing a gale from southwest.

The sudden rise of the plateau off Charleston, together with the meeting of the Arctic current, creates a remarkable disturbance.

In July, 1880, I reported finding a current off Charleston some fifty miles or more from the 100-fathom curve, setting southwest. When our trawl was dragging on the bottom the vessel headed northeast, and drifted over two miles an hour southwest. I found this southwest current off Charleston, and between Charleston and Cape Fear every time last summer that I crossed the stream, but I did not find it at any other point.

In the summer of 1880, we passed through a wide belt of rippling water off Charleston, and this last summer I was frequently asked by captains and pilots if in my cruising in the stream I had seen "Little Hell" off Charleston.

We crossed the stream six times in this locality under conditions of weather from a calm to a strong breeze, and always crossed (near the centre of the stream,) bands of rippling water several miles in width. It is very like the rip at the entrance to Long Island Sound.

A very striking example of the influence of the wind on the current was experienced by us off Cape Lookout. We were in mid-stream, with the current setting well to the northward, when a fresh gale came on from the N. W. The current was turned almost due east, and for twelve and a half hours we had a current of 4.9 knots per hour E. by N. The vessel was heading *west* all this time, under full steam and foresail.

At such points where we anchored off the coast in from 20 to 60 fathoms, the current cans gave a set to the northward of about 1.7 knots. Near the coast the set of the current depends entirely on the direction of the wind.

We had as a whole very good working weather, and what was especially necessary, a clear sky, though twilights, on which we principally rely, were very difficult to obtain, owing to the mist rising from the heated water of the stream. We had a few very severe squalls off Hatteras, and one gale of wind that lasted four days, during which I took a sounding while hove to under close reefed mainsail and steam in 2,480 fathoms, without any trouble whatever, which speaks well for the Sigsbee sounding machine.

Commander Sigsbee, in his book on deep-sea sounding, has given an exhaustive description of all the appliances used on the *Blake* to date, but as the Siemens deep-sea thermometer is entirely new, it will be interesting to have some account of it. Its principle is based upon the variations in electrical resistance of metals arising from changes

of temperature. We have 2,600 fathoms of double insulated cable wound on the dredging-reel; to the end of this is attached a resistance-coil, which coil is lowered to any depth required. The other ends of the insulated cable are brought to a room on the main deck and are attached to a Wheatstone bridge specially arranged for this purpose. Another resistance-coil of the same material and resistance as that lowered into the sea is likewise attached to the bridge. The latter coil has an attached thermometer and is kept in a copper vessel filled with water. A battery of twelve Leclanche's cells and a Thompson's marine galvanometer are attached to the bridge. If the resistance-coil at the end of the cable is lowered into the sea just below the surface and some of the same water is placed in the copper vessel containing the comparison-coil, and a current is sent into the bridge, the reflected pencil of light will be at zero on the scale, as under these conditions both resistance-coils are in the same temperature. If the cable is then paid out and the resistance-coil at its end reaches any depth, say 100 fathoms, where the temperature is lower, the circuit being closed, the pencil of light will be deflected to the left. Now, if cold water is added to that in the copper vessel containing the comparison-coil, with the circuit closed, until the pencil of light comes back to zero on the scale, it is assumed that the water around each coil is the same, and the reading of the attached thermometer of the comparison-coil will give the temperature at 100 fathoms, the depth to which the cable has been lowered. After taking a series of temperatures to 800 fathoms in this way, the cable was reeled in, stopping at intervals for temperatures; in this case, with circuit closed, the deflection of light was to the right, and it was necessary to raise the temperature in

the copper vessel until the light was brought to zero on the scale.

After August 10th, fearing the approach of the hurricane season, sounding work was suspended; but before returning north I made a number of trials with the Siemens apparatus. I received a Carré ice machine at Fortress Monroe and used the ice-water made by it to reduce the temperature of the deck resistance-coil. The trials were made in latitude 36° 50′ N., longitude 74° 25′ W., during a perfect calm, with smooth sea; the ship's engine not being used during the time. Under the above conditions the results of our several lowerings were very satisfactory. Having taken many thousand deep-sea temperatures with the Miller-Casella thermometers, my confidence in them was greatly strengthened when, after repeated lowerings, their readings agreed. With the Siemens apparatus readings can be taken to one-quarter of a degree. With the Miller-Casella it is hard work to decide on half a degree.

In a previous trial in the strength of the Gulf Stream, off Charleston, during moderate weather, with the vessel rolling 15°, it was found very difficult to read the galvanometer, and this could only be done when the engine was at rest. Under these trying circumstances, however, the temperature agreed with the Miller-Casella. I give an example of a single lowering off the Chesapeake.

	Depth in Fathoms.												
	Surf.	5	10	15	20	30	50	75	100	150	200	300	400
Siemens App.....	76⅛	76⅛	76⅛	69	58	54	54⅛	52⅛	50⅛	46⅛	43⅛	40⅛	40
Miller-Casella.....	76⅛	76⅛	76	68	58	54	53⅛	52⅛	50⅛	46⅛	43¼	40¼	40

The above was taken on August 11th, and on the 12th the Siemens thermometer indicated a warm strata of water between 30 and 75 fathoms. The Miller-Casella gave only the maximum and minimum and did not indicate this. The temperature at 20 fathoms was 57° with both thermometers; at 30 fathoms, 52°; but at 50 fathoms the Siemens thermometer read 54½, while the minimum of the Miller-Casella read the same as at 30 fathoms. At 75 fathoms the Siemens read 53, the Miller-Casella still 52°; at 100 fathoms they agreed at 50½°. These observations were continued during the entire day, with always the same results. By lowering the Miller-Casella thermometer at the rate of 200 fathoms a minute to 50 fathoms, and hauling it up 30 fathoms at the same rate, the temperature would read as high as 53½°.

It is certainly very important to be able to detect underlying currents, and with this new apparatus we shall be able to do so. It is a practical and very simple means of overcoming the trouble of obtaining accurate deep-sea temperatures, and great credit is due to Mr. Siemens, of London, for its invention, and to our Coast Survey, for being willing to expend the large amount for the necessary apparatus for its trial.

I trust that I may be pardoned if I make a slight digression to state a fact in physics with which many may be familiar.

I am often asked the lowest temperature that I have found when sounding. My reply has been 35 degrees in 3,000 fathoms. I am generally told that this is impossible, as the temperature of the maximum density of water is 39½ degrees Fahr., and that if my thermometers show a lower

temperature, it must be owing entirely to pressure. If physics did not teach them differently, a single illustration from the *Blake's* soundings would prove that they were in error. In the Windward passage we found the temperature at 700 fathoms to be 39½ degrees, and the same to the northward and southward of the passage at the same depth. North of the connecting ridge, between Cuba and Haiti, the temperature gradually fell as the depth increased until, at the bottom, in 2,000 fathoms, it was 36½ degrees; but south of the ridge and within twenty miles the temperature was 39½ degrees at 2,000 fathoms. The pressure was the same in both cases.

Ganot says: "Water presents the remarkable phenomenon that when its temperature sinks it contracts up to 4 degrees Cen., or 39½ degrees Fahr.; but from that point, although the cooling continues, it expands up to the freezing point; so that 39½ degrees Fahr. represents the point of greatest contraction of water."

The above is very often quoted to me; but I find Ganot states if water contains salts or other foreign bodies, its freezing point is lowered, and that sea-water freezes at—2.5 degrees to—3 degrees Cen.

In 1833 M. Depretz determined that the temperature of the maximum density of sea-water, which contracts steadily till just above its freezing point, is—3.67 degrees Cen. or 25.4 degrees Fahr. Sir Wyville Thomson found the average temperature of the bottom of the deep sea, in temperate and tropical regions, about 0 degrees Cen., or 32 degrees Fahr., the freezing point of fresh water. In 1818 Sir John Ross found during his Arctic voyage a temperature of—3.5 Cen., 25.75 degrees Fahr., in 680 fathoms, and Thomson found it as low as—3 degrees Cen. off Greenland.

With the Siemens apparatus I found 38½ degrees Fahr. at 800 fathoms, the Miller-Casella thermometer giving the same reading.

The Coast and Geodetic survey will continue these interesting investigations of the Gulf Stream, and it will always give me pleasure to present to you the results of the *Blake's* work.

Mr. Hilgard, the present superintendent, kindly gave me permission to use the data that I have given in this paper.

LINES OF SOUNDINGS, WITH GENERAL DATA, I

Distance between soundings....	2¼	2¾	2¼	5½	5
Depth in fathoms.....	10	31	95	176	250
Char. of bottom.....	fne. S.	G. Sh.		Co. S.	Co. S.
Surface temp.....	80°	80°	80°	80°	82½°
Bottom temp.....	78°	71°	57°	50°	50°
Current.....		N 1	N 2	N 3	N 5.4

Distance between soundings....	11	10	13	4¾	5
Depth in fathoms	10	20	84	158	231
Char. of bottom.			gr. S.	fne. S.	fne. S.
Surface temp.....			80°	80°	80½°
Bottom temp.....			57°	52°	46½°
Current			N 2	N 2	N 2.5

Distance between soundings ...	10	10	5	13½	4½
Depth in fathoms	10	15	25	77	173
Char. of bottom.....					Co. S.
Surface temp.....				80°	80°
Bottom temp.....				59°	49°
Current.....				NxE 2.5	NxE 2.5

Distance between soundings....	3½	25½	9¼	8¾	4¾
Depth in fathoms	10	13	18	27	42
Char. of bottom.....			brk. Sh.	brk. Sh.	crs. S., brk. Sh.
Surface temp.....		80°	80°	82°	82°
Bottom temp.....		74°	70°	64½°	55½°
Current.....				NW 1	NW 1.5

Distance between soundings....	19	15	29½	2¼	5½
Depth in fathoms.....	10	15	28	47	141
Char. of bottom.....					
Surface temp.....			82°	82°	83°
Bottom temp.....			68°	66½	47°
Current.....				NNE 2.7	NNE 2.7

Distance between soundings....	20	19½	8¼	8¼	5¾
Depth in fathoms.....	10	18	21	20	31
Char. of bottom.....			G.	G.	S. brk. Sh.
Surface temp.....		79°	79°	79½°	80½°
Bottom temp.....		74½°	70½	67°	67°
Current		O.	O.	NNE 1	NNE 1

Distance between soundings....	18	15	6	5½	7
Depth in fathoms.....	10	20	25	75	142
Char. of bottom.....					
Surface temp.....					
Bottom temp.....					
Current.....					

Distance between soundings....	15	17	20½	7	7
Depth in fathoms.....	10	15	19	32	70
Char. of bottom.....			crs. yl. S. bk. sp.	G. sh.	wh. bk. rd. S.
Surface temp.....			80°	80°	80°
Bottom temp.....			73°	69°	60°
Current.....			NE 0.4	SE 1.5	SE 1.5

Distance between soundings....	13	15¼	10¾	10¾	7
Depth in fathoms.....	10	17	19	20	21
Char. of bottom.....			brk. sh.	crs. S.	fne. gy. S.
Surface temp.....		81°	81°	81°	82°
Bottom temp.....		73°	72°	66½°	66½°
Current.....		N. 0.4	O.	O.	O.

Distance between soundings....	1½	8¼	10¾	10	5
Depth in fathoms.....	4½	15	19	36	107
Char. of bottom.....		fne. blk. S.	fne. gy. S.		
Surface temp.....	80½°	82°	83½°	83°	84°
Bottom temp.....	78°	73°	76°	62°	58½°
Current.....				NExN 1.75	NExN 1.73

LINE K.——FROM CAPE HATTERAS

Distance between soundings....	7½	14½	2	2	2½
Depth in fathoms.....	11	36	66	303	427
Char. of bottom.....				Glob. oz.	Glob. oz.
Surface temp.....	79°	79½°	80°	82½°	84°
Bottom temp.....	73°	66°	52°	41½°	40°
Current.....		ENE 2.5	ENE 2.5	ENE 2.5	ENE 2.5

Distance between soundings....	5½	10½	10	10½	4½
Depth in fathoms.....	10	16	16	21	24
Char. of bottom.....				fne. S.	
Surface temp.....	79°	79°	79°	77½°	77°
Bottom temp.....	71½°	59½°	52°	49°	46°
Current.....	SW 0.5	SW 0.5	SW 0.5	SW 0.5	SW 0.5

NOTE.—THE DISTANCES BETWEEN SOUNDINGS ARE GIVEN I

fne.—Fine.

The first line A was ran June 1st,

TA, RUN NORMAL TO THE COAST AND ACROSS THE

Commander

LINE A.——Fr

5	5½	5	5½	4½	4½	4¼	
250	341	416	439	395	347	294	6
Co. S.	Co. S.	Co. S.	Ptd. oz.	Co. S.	Co.	Co.	C
82½°	83°	83½°	82½°	81½°	81½°	81½°	8
50°	44°	44°	44°	45°	52°	56½°	
N 5.4	N 5.4	N 5.4	N 2.7	N 1.25	N 1.25	N 1.25	

LINE B.——Fr

5	5	4½	4	3½	4⅝	5½	5
231	321	446	426	387	394	412	44
ne. S.	Co. S.	Co.	Co.	Co.	Co.	Co.	Co.
80½°	81°	81°	81½°	81½°	82°	82°	8
46½°	44½°	42½°	44½°	46½°	47½°	46°	4
N 2.5	N 2.5	NNW 3.5	NNW 4	NNW 4	N 3	N 2	N

LINE C.——Fro

4½	4½	4½	4½	4⅝	4½	4⅝	45
173	265	425	464	459	465	466	Ptd.
Co. S.	Co. S.	Co. S.	Co.	Co. S.	Ptd. oz.	Ptd. oz.	8
80°	80°	81°	81°	81½°	81½°	81½°	
49°	44½°	42½°	42½°	43½°	44°	44°	4
xE 2.5	NxE 2.5	NxE 2.5	NxE 2.5	NxE 3	NxE 3	NxE 3	NxE

LINE D.——Fr

4⅞	4½	4	4½	3½	3½	5	5
42	225	284	344	387	415	433	45
S., brk. Sh.	crs. S., brk. Sh.	fne. S.	Co. S.	Co.	Co.	Co.	C
89°	83°	85°	88½°	88½°	86½°	85½°	8
55½°	43°	44½°	43°	44½°	45½°	45½°	4
W 1.5	NW 1.5	NxW 2	NNW 3	NNW 3	NNW 3	NNW 3	NN

LINE E.——F

5½	4½	4½	4½	4	4½	4½	4
141	195	271	314	375	444	460	48
	Co. bk. S.	Co.	Co. S.	Co. S.	Co. S.	Co.	C
83°	83½°	83½°	83½°	83°	83°	83°	8
47°	46½°	45°	44°	44°	44°	44°	4
NE 2.7	NNE 2.7	NNE 2.7	NNE 2.7	NNE 2 7	NNE 2.7	NNE 2.7	NNE

LINE F.—

5⅞	5⅞	6	6½	6	5½	5½	3
31	53	122	266	265	265	260	C
brk. Sh.	bk. wh. G.		Co.		Co.	Co.	8
80½°	81½°	81½°	82½°	82°	82°	82°	5
67°	63½°	59°	43½°	44½°	46½°	48½°	N
NNE 1	NNE 1	NNE 1	NNE 1	NNE 2.4	NNE 2.4	N 1.5	

LINE G.—

7	5½	5½	2¾	5	7	3½	2
142	225	217	216	228	225	284	
						Co. S.	
				80°	80°	82°	
				45°	45°	44°	
					E ¼ N 3.2	E ¼ N 3.2	E ¼ N

LINE H.——Fr

7	7	4	4½	5	5	5½	3
70	111	123	159	182	224	278	
bk. rd. S.	gn. S.	Co.		wh. bk. S.	S. G.	fne S.	Co.
80°	80½°	81°	81½°	80½°	81°	81½°	8
60°	54°	52°	49°	47°	47°	43°	4
SE 1.5	SE 1.5	O.	NWxW .75	NWxW .75	NWxW .75	NWxW .75	NE ¼

LINE

7	3⅝	4½	3½	3½	3½	3½	2
21	54	92	129	164	184	209	
e. gy. S.	S. G. brk. Sh.			gy. S.			
82°	83°	82½°	82°	82½°	82°	83°	
66½°	63°	55°	50°	47½°	45½°	45°	4
O.	O.	O.	NWxW 2.	NWxW 2.	NWxW 2.	NE ½ N 2.	NE

LINE J.—

5	5	4	6⅝	11¾			
107	242	527	1494	2046			
	brk. Sh.	Glob. oz.	Glob. oz.	Glob. oz.			
84°	86°	86°	85°	85°			
58½°	42½°	39°	37½°	36°			
ExN 1.73	NExN 1.75	NE ½ E 2.75	NE ½ E 2.75	NE ½ E 2.75			

HATTERAS TO LAT. 35° 21′ N.; LONG. 74° 20′ W.

2¼	4½	5	7¼	7¼	¾	1¾	17
427	1221	1458	1560	1609	1643	1627	Glob
lob. oz.	Glob. oz.	Glob. oz.	Glob. oz.	Glob. oz.	Glob. oz.	Glob. oz.	8
84°	84°	84°	84½°	84½°	84°	84°	
40°	37½°	37½°	37½°	37½°	37½°	37°	3
NE 2.5	ENE 2.5	ENE 2.5	ExN 3.	E 4.	E 4.	E 3.	E

LINE L.—

4½	4½	4	2⅝	2½	2⅝	2⅞	8
24	24	51	196	536	677	749	Glob
	S. G. bk. Sh.	S. brk. Sh.	fne. gn. S.	Glob. oz.	Glob. oz.	Glob. oz.	7
77°	77°	76½°	76°	76°	76°	77°	
46°	43°		42°	39°	38°	38°	3
SW 0.5	SW 0.5	SW 0.5	SW 0.5	SW 0.5	SW 0.5	SW 0.5	SW

E GIVEN IN NAUTICAL MILES, THE FIRST SOUNDING BEING MEASURED FROM THE

Th

fne.—Fine. *bk.*—Black. *gy.*—Grey. *wh.*—White. *rd.*—Red. *gn.*—Green. *brk*

ran June 1st, 1881, and they were continued to the northward during June and July. The lines were ru

AND ACROSS THE GULF STREAM, FROM JUPITER INLET

Commander J. R. Bartlett, U. S. Navy, Asst U. S. C. & G.

LINE A.—From Jupiter Inlet, Fla., to Memory Rock, Little Bahai

4½	4½	4½	½				
347	294	67	4				
Co.	Co.	Co.	Co.				
81½°	81½°	80°	78°				
52°	56½°		78°				
N 1.25	N 1.25		Var.				

LINE B.—From Shore, Latitude 27° 57′ N. to Lat. 27° 51′; Long. 77

4⅜	5½	5½	5½	6	4½	4½	4⅜
394	412	448	466	497	473	483	504
Co.	Co.	Co. S.	Co. S.	Co. S.	Ptd. oz.	Ptd oz.	Ptd. oz.
82°	82°	83°	82°	81°	79°	79°	79°
47½°	46°	45°	44°	44°	44½°	44½	44°
N 3	N 2	N 1.5	O.	S. 0.5	[☞		

LINE C.—From Shore, Latitude 28° 40′ N. to Lat. • 28° 44′ N.; Long.

4½	4½	4⅜	4½	3⅜	3⅜	5½	10
465	466	459	456	458	466	464	478
Ptd. oz.	Ptd. oz.	Ptd. oz.	Ptd. oz.	Ptd. oz.	Ptd. oz.	Ptd. oz.	Ptd. oz.
81½°	81⅜°	81⅜°	82°	82°	81½°	80°	79°
44°	44°	44°	45°	45°	45°	45°	44½°
NxE 3	NxE 3	NxE 2.8	N 1.5	N 1			8xE 0.8

LINE D.—From Shore, Latitude 29° 25′ N. to Lat. 29° 31′ N.; Long.

3½	5	4⅜	4⅜	5⅛	5⅛	5⅛	9½
415	433	457	449	445	444	451	441
Co.	Co.	Co.	Co.	Co.	Co.	Co.	Ptd. oz.
86½°	85½°	84°	84°	84°	84°	83°	81½°
45½°	45½°	46°	45°	46°	48°	47°	47½°
NNW 3	NNW 3	NNW 3	NNW 3	NNW 3	[☞		

LINE E.—From St. John's River, Fla., to Lat. 30° 30′ N.; Long. 76°

4½	4½	4	5½	5½	5½	5	5½
444	460	480	480	467	445	449	464
Co. S.	Co.	Co.	Co.	Co. S.	Co. S.	Co.	Ptd. oz.
83°	83°	82½°	82½°	82½°	82½°	82°	82½°
44°	44°	44°	45°	45½°	47°	46½°	46°
NNE 2.7	NNE 2.7	NNE 2.7	N ¾ E 1.25	N ¾ E 1.25	N ¾ E 1.25	N ¾ E 1.25	N ¾ E 1.25

LINE F.—From Tybee Roads, Ga., to Lat. 30° 51′ N.; Long. 77° (

5½	5½	5⅝	5½	5½	5½	5	5½
265	260	320	301	338	385	434	445
Co.	Co.	Co.	Co.	Co.	Co.	Ptd. oz.	Ptd. oz.
82°	82°	82°	83°	83°	82½°	82°	82½°
46½°	48½°	50°	51°	53½°	54½°	54½°	53°
NNE 2.4	N 1.5	N 1.5	N 1.5	N 1.5	N 1.5	N 1.5	N 1.5

LINE G.—From Cape Roman, S. C., to Lat. 30° 59′ N.; Long. 77°

7	3½	3½	3¾	3½	3¾	3½	3¾
225	284	254	349	344	353	378	312
	Co. S.		Co. R.	Co. R.	Co. R.	Co.	Co.
80°	82°	82°	82½°	83°	82°	82°	82°
45°	44°	45½°	44½°	45°	46½°	48°	51½°
E ¼ N 3.2	E ¼ N 3.2	E ¼ N 3. 2	E ¼ N 3.2	E ¼ N 3.2	E ¼ N 3 2	E ¼ N 3.2	E ¼ N 3 2

LINE H.—From Shore, Latitude 33° 38′ N. to Lat. 31° 27′ N.; Long.

5	5½	6¼	6	6¼	6⅜	6¼	6¼
224	278	349	377	503	460	451	512
S. G.	fne S.	Co. R.	Co.	Co.	Co.	Co.	
81°	81½°	81°	83°	83½°	83°	83°	82½°
47°	43°	44°	42½°	38½°	46°	46°	39°
NWxW .75	NWxW .75	NE ¾ E 1.7	NE ¾ E 1.7	NExE ¼ E 3.5	NExE ½ E 3.5	NExE ½ E 3.5	NExE 2.5

LINE I.— From Cape Fear to Lat. 32° 05′ N.; Long. 76° 09′

3½	3¼	3¼	2¾	1⅞	2	1⅞	3
184	209	238	259	286	319	338	364
			S.	bk. wh. S.	bk wh. S.	Glob.	Glob.
82°	83°	84°	84½°	84½°	84°	8 °	84°
45½°	45°	45°	46°	45°	44°	41°	42°
NWxW 2.	NE ¼ N 2.	NE ¼ N 2.	NNE 5.	NNE 5.	NNE 5.	NNE 5.	NNE 2.5

LINE J.— From Cape Lookout, N. C., to Lat. 34° 09′ N.; Long. 75°

E BAHAMA BANKS.

LONG. 77° 33′ W.

4⅜ 504 Ptd. oz. 79° 44°	5 516 Ptd. oz. 78° 44°	5½ 537 Ptd. oz. 78° 43¾°	4⅜ 503 Ptd. oz. 78° 42½°	5 582 Ptd. oz. 78° 40°	4½ 589 Ptd. oz. 78° 39½°	5½ 584 Ptd. oz. 79° 39½°
			Southerly			

.; LONG. 78° 22′ W.

10 478 Ptd. oz. 79° 44½° SxE 0.8	10½ 494 Ptd. oz. 79° 43½° SxW 1	9½ 513* Ptd. oz. 78½° 42° SSW 1.5	9½ 528 Ptd. oz. 79° 41°			

; LONG. 76° 38′ W.

9½ 441 Ptd. oz. 81½° 47½°	9 448 Ptd. oz. 80½° 47½° Slight	9 459 Ptd. oz. 80½° 47½° current to Sd.	9 467 Ptd. oz. 80½° 43½°	10 470 Ptd. oz. 80½° 45°	10 467 Ptd. oz. 81° 43½° O.	10½ 468 Ptd. oz. 81° 46° O.

ONG. 76° 44′ W.

5½ 464 Ptd. oz. 82½° 46° N ¾ E 1.25	4½ 456 Ptd. oz. 83° 45½° N ¾ E 1.25	6½ 453 Ptd. oz. 82° 44½° NNE 1	10½ 456 Ptd. oz. 82½° 44° O.	10½ 475 Ptd. oz. 84½° 45° O.	11½ 482 Ptd. oz. 83° 47° O.	11 468 Ptd. oz. 83½° 46° O.

NG. 77° 09′ W.

5⅛ 445 Ptd. oz. 82½° 53° N 1.5	5 483 Ptd. oz. 81½° 46° N 1.5	5½ 474 Ptd. oz. 81½° 46° N 1.5	5½ 474 Ptd. oz. 81½° 45° N 1.5	23½ 505 Ptd. oz. 81° 44½° O.	22½ 578 Ptd. oz. 81° 39½° O.	7⅓ 981 Ptd. oz. 80° 38° O.

ONG. 77° 17′ W.

3¾ 312 Co. 82° 51½° E ¾ N 3.2	3¾ 316 Co. 82° 53° E ¾ N 3.2	3¾ 310 Co. 83° 52° ENE 2.5	4 325 Co. 83° 53° ENE 2.5	4 353 Co. 82° 54° ENE 2.5	4½ 413 Co. S. 82° 51° ENE 2.2	4 438 Co. 81½° 47° ENE 2

; LONG. 76° 00′ W.

6½ 512	6 595 Co. S. 82½° 38½° NExE 1.5	6 637 Ptd. oz. 82° 38½° NExE ¼ E 1.5	6 902 Ptd. oz. 81½° 38½° NExE ¼ E 1.5	6 1241 Ptd. oz. 81½° 37° NExE ¼ E 1	35¼ 1672 Ptd. oz. 82° 36½° O.	

76° 09′ W.

3 364 Glob. 84° 42° NNE 2.5	3 386 Glob. 84° 43° NNE 2.5	3½ 410 Glob. oz. 84° 43° NNE 2.5	3½ 434 Glob. oz. 84° 42° NNE 2.5	3½ 459 Glob. oz. 84° 42° NNE 2.3	3½ 492 Glob. oz. 84° 40° NNE 2.3	3 535 Glob. oz. 84° 40° NNE 2.3

ONG. 75° 22′ W.

LINE K‴.——FROM CAPE

			8½ 10	3½ 20	4 25	4 30

NG. 74° 17′ W.

are :

ks. *Co.*—Coral. *Co. R.*—Coral rock. *Glob. oz.*—Globigerina ooze. *Ptd. oz.*—Pteropod o

As mentioned in the paper, the direction of the current was very much influenced by direction and fo

4⅓ 589 Ptd. oz. 78° 39½°	5¼ 584 Ptd. oz. 79° 39½°	5⅓ 589 Ptd. oz. 78° 39½°	5¼ 601 Ptd. oz. 78° 39°	8 609 Ptd oz. 78° 39°
10 467 Ptd. oz. 81° 43½° O.	10¼ 468 Ptd. oz. 81° 46° O.	10¼ 476 Ptd. oz. 81° 47° O.	9⅞ 498 Ptd. oz. 81½° 46½° O.	9¼ 523 Ptd. oz. 82° 45° O.
11¼ 482 Ptd. oz. 83° 47° O.	11 468 Ptd. oz. 83½° 46° O.	11⅛ 464 Ptd. oz. 85⅛° 46° O.	10⅜ 484 Ptd. oz. 84° 45½° O.	10⅜ 585 Ptd. oz. 82° 39½° O.
22½ 578 Ptd. oz. 81° 39½° O.	7½ 981 Ptd. oz. 80° 38° O.			
4½ 413 Co. S. 82° 51° ENE 2.2	4 438 Co. 81½° 47° ENE 2	6⅞ 458 Ptd. oz. 81½° 46° ENE 1	5⅝ 466 Ptd. oz. 81½° 46° NE ¼ E 1	7½ 499 Ptd oz. 81° 47° NE ¼ E 1
35¾ 1672 Ptd. oz. 82° 36½° O.				
3½ 492 Glob. oz. 84° 40° NNE 2.3	3 535 Glob. oz. 84° 40° NNE 2.3	2⅞ 605 Glob. oz. 84° 39° NNE 2.3	3½ 729 Glob. oz. 84° 38½° NNE 2.3	4¾ 959 Glob. oz. 83° 38° O.

INE K'''.——FROM CAPE HATTERAS TO LAT. 34° 37′ N

4 25	4 30	5 116 S. brk. Sh. 82° 48½° SW 0.7	2⅞ 189 Glob. oz. 82½° 45° SW 0.7	3¼ 678 Glob. oz. 82½° 39° SW 0.7

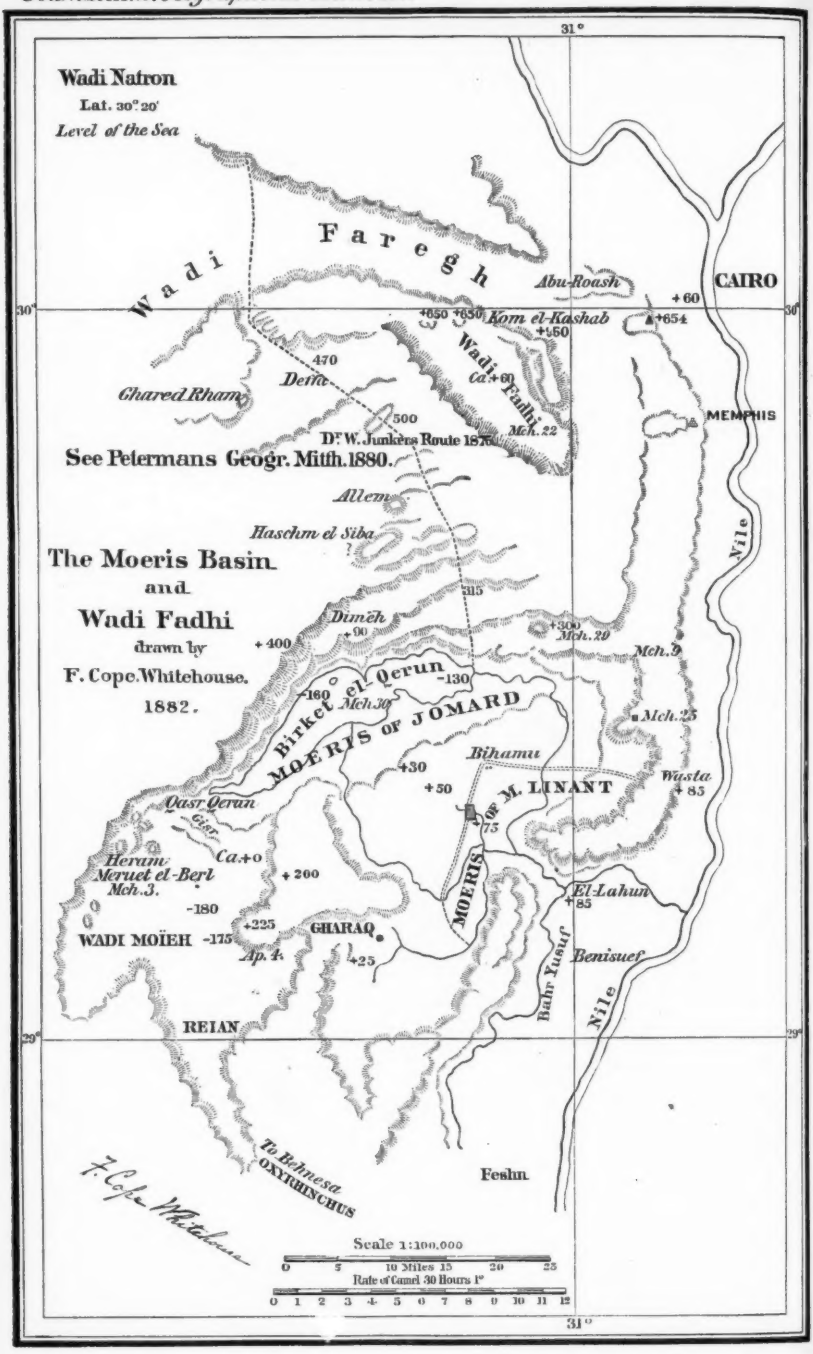
na ooze. *Ptd. oz.*—Pteropod ooze.

ch influenced by direction and force of the wind.——J. R. B.

8 609 Ptd oz. 78° 39°	5 619 Ptd. oz. 77½° 39°	5¼ 621 Ptd. oz. 78° 39° [illegible]		
9½ 523 Ptd. oz. 82° 45° O.	9 510 Ptd. oz. 82° 47½° O.	9½ 559 Ptd. oz. 81½° 44½° O.	9¼ 694 Ptd. oz. 81½° 39½° O.	9½ 2,100 Ptd. oz, 81½° 36½° O.
10⅜ 585 Ptd. oz. 82° 39½° O.	9½ 1,047 Ptd. oz. 81½° 38° O.	10½ 1,531 Ptd. oz. 80¾° O.	10½ 1,638 Ptd. oz. 80¾° 36¼° O.	
7½ 499 Ptd oz. 81° 47° NE ¼ E 1	7½ 528 Ptd. oz. 81° 42½° NE ¼ N 1.3	10½ 626 Ptd. oz. 81° 39° NE ¼ N 1.3		
4¾ 959 Glob. oz. 83° 38° O.	4¾ 1189 Glob. oz. 83½° 37½° O.	9 1288 Glob. oz. 83½° 37½° O.	7 1351 Glob. oz. 83½° 37½° O.	5⅞ 1406 Glob, oz. 82½° 37 O.

4° 37′ N.; LONG. 75° 17′ W.

3½ 678 Glob. oz. 82½° 39° SW 0.7	2 999 Glob. oz. 82° 38½° SW 0.7	3 1309 Glob. oz. 82° 38° SW 0.7	3 1361 Glob. oz. 83° 37½° SW 0.7


31°
Wadi Natron
Lat. 30° 20'
Level of the Sea
Wadi
Faregh
Abu-Roash
CAIRO
+60
30°
+650
+650
Kom el-Kashab
+650
+654
470
Deïr
Ca.+60
Wadi Fadhi
Ghared Rhamo
500
MEMPHIS
Dr. W. Junkers Route 1876
Mch. 22
See Petermans Geogr. Mitth. 1880.
Allem
Haschm el Siba
?
The Moeris Basin
and
Wadi Fadhi
drawn by
F. Cope Whitehouse.
1882.
315
Dimēh
+90
+300
Mch. 20
Mch. 9
+400
Birket el Qerun
-130
-160
Mch. 30
MOERIS OF JOMARD
Mch. 25
Bihamu
+30
+50
Wasta
+85
MOERIS OF M. LINANT
Qasr Qeran
Ca.+0
Heram
Meruet el-Berl
Mch. 3.
+200
-180
El-Lahun
+85
WADI MOÏEH
-175
+225
GHARAQ
Ap. 4.
+25
Benisuef
Bahr Yusuf
Nile
REIAN
29°
To Behnesa
OXYRHINCHUS
Feshn
F. Cope Whitehouse
Scale 1:100.000
0 5 10 Miles 15 20 25
Rate of Camel 30 Hours 1°
0 1 2 3 4 5 6 7 8 9 10 11 12
31°

LAKE MOERIS:

FROM RECENT EXPLORATIONS

IN

THE MOERIS BASIN AND THE WADI FADHI.

BY

F. COPE WHITEHOUSE, M. A., ETC.

The plain of the Nile Valley to the westward of Cairo stops at the feet of the sphinx. Above rises for nearly 150 feet the broken edge of the limestone plateau, on which stand the pyramids of Gizeh. The tops of these structures, although 650 feet above the level of the Mediterranean, are not as high as the bold summit of Abu-Roash, about five miles to the south, or the crest of the slope, which, after passing the brow of that hill on whose side the pyramids are built, rises gently for seven miles to the range that bounds the horizon. The peak of the Kom el-Kashab, or "Hill of Petrified Wood," is 200 feet above the eye line of the spectator who stands upon the top of the Pyramid of Cheops. There is nothing to show the character of the desert beyond, and although but an inconsiderable distance from Cairo, it was impossible to obtain there any data from which to decide between the dead level of the latest maps and the vague lines and still more perplexing colors of those of Jacotin and Mahmoud. Both seemed to be sustained by recent publications of great weight.

The terms "Moeris Basin" and "Wadi Fadhi" are new, and require both explanation and defence. The latter is that "empty valley" or as it might be translated into French,

la vallée vide, which owes its name perhaps to a survival from the period of Roman occupation.

The Moeris Basin seems a convenient expression for that part of Egypt lying to the south of Cairo and west of the Nile, in which the ancient historians and geographers place the erosion or excavation which was known under the name of a mythical king, "Moeris" or "Myris," who constructed it. The basin of the lake naturally includes the adjacent coast, the hills watered by the moisture, the plain fertilized by "shadoof" or conduit, and a part of the canal of supply. It is the area covered by the accompanying map. In order to present the most striking characteristic of this basin, viz.: its depth; figures marked + show the height above the Mediterranean, and those with the sign – prefixed indicate the corresponding depth in feet below the sea. The dates mark the chief places visited. They are not given on account of any interest attaching to personal movements, but because they furnish the best corroborative evidence of what was actually accomplished. The other parts of the map scarcely need explanation. The Nile to the east skirts the Arabian Desert. There is practically no cultivation, therefore, to the right of the river. Between its broad bed and the sinuous course of the Bahr Yusuf, or 'river of Joseph,' as it is commonly called, the valley is slightly lower than the edge of the two water courses. The irrigation is almost always exclusively towards the band of productive soil embraced between them. This Bahr Yusuf, which commences where the railway terminates, now stops near El-Lahun. It once skirted the hills to the north, and although enough water was diverted near the bend between Wasta and Memphis to

make the far-famed Heracleopolis Magna and the "city" or "Island of the Nile," it continued its course to Alexandria, offering facilities for navigation, local and Euro-Indian commerce, while supplying water for irrigation and sustenance to the cities on the western side of the Delta, and even filling the last "Meri," "Maria" or "Mariut," now a salt water lagoon behind Alexandria. The "Natron" or salt valley to the west, lying at the level of the sea, might, in the recent opinion of Dr. Jordan, again receive its water from a canal quitting the Bahr Yusuf near the pyramids of Gizeh. From a pre-historic period, and certainly during the last twenty-five centuries, it has also poured in a copious stream through the hills to the west. Here an oasis, lake, marsh and fertile land, now known as the Fayoum, depends for existence on its continuous flow.*

Such an extended claim for "Moeris" requires justification. It ought not to pass unchallenged into the category of accepted geographical facts and names. It has been decided adversely, although Bossuet was heard in its defence. The opinion of competent experts, with accurate and cautious minds, prejudiced to some extent in favor of the ancient lake, has been unanimous against it. "Moeris" was a phantasm. 'An idle tale palmed upon the Greeks first, and the Romans afterwards, was copied by writers who never visited the spot, or were too indulgent to denounce the imposition.' Such a lake, it was said, would reach from Cairo to Siût, and its surface would be as high as the Nile at the cataract of Assouan.

Investigation showed that the case had never been duly

* In "The Land of Khemmi" (1881), Mr. L. Olyphant has given a full account, with charming pictures, of his sojourn in this agreeable spot.

presented. An accurate translation of the old records, with a generous desire to treat them with liberality, removed the inherent contradictions, and deprived their opponents of a weapon which had been used with fatal results to historical truth. The examination of the desert also showed that modern writers had no cause to assert a superiority. The sharp contradictions disappeared ; the problem seemed to solve itself. If, therefore, ancient history be examined in the light of these late explorations, it will be seen how little room is left for dispute ; and this course has manifest advantages over elaborate argument.

"Wonderful as is the Labyrinth," says Herodotus, "the work called the Lake of Moeris, which is close by the Labyrinth, is yet more astonishing." 'Its entire circuit is sixty days' 'tracking;' its circumference by land, 450 miles ; and its coast as long as the shore line from the Plinthinetic Gulf, near Alexandria, to Lake Serbonis, beyond Port Said. The lake stretches in its longest direction from north to south, and in its deepest part is of the depth of fifty fathoms. The water of the lake is not due to springs. It does not well out of the ground. This inland sea is in an arid desert. The supply is obtained from the Nile by a canal. The current sets for six months into the lake from the river, and for the next six months into the river from the lake. It is manifestly artificial. It is an excavation or erosion, and the material was removed by the same agent which formed it. A branch of the Nile, rushing into it as the inundation rose, swept round it and the water charged with silt dispersed the deposit along the marshy sea-board of the Delta.'

A marked change has taken place in the degree of confi-

dence which attaches to the statements of the ancient historians. It is well understood that the Greek and his countrymen were inferior in mechanical skill, administrative sagacity and commercial enterprise to the former inhabitants of Egypt. Herodotus states this with great frankness. But its social order had been seriously disturbed. At an earlier period, civilization or specialization had reached its utmost limits. The Nile had been mastered. Its altered nature, its feminine attributes of gentleness and fecundity, were due to the great basins in Nubia, such reservoirs as Syene and Medinet Haboo, and the dams of rushes at Silsilis and elsewhere, which stored the water or arrested the destructive wave of some sudden burst of rain at the sources of that mountain torrent, the Blue Nile, liable to rise suddenly and sweep away everything it encountered on its rapidly descending course. By "Os-ir-is," however, ran "Is-is." Below the first cataract to the Delta the river was accompanied by a series of parallel canals. Confined between precipitous cliffs, the gorge, which it traverses for 600 miles, is nowhere more than nine miles broad in its cultivable area. This system required a "pontiff." An inexorable and to some extent arbitrary fiat determined the distribution of water for direct sustenance, irrigation and the countless industries which made the favored region, endowed with an inexhaustible water-power, the Yorkshire of the pre-Christian world.

The activity from which Hadrian shrank was, in Roman days, transferred to the North. In the fifth century, B. C. the old Memphite and Theban Empires were strewed with the wrecks of engineering and administrative machinery. Everywhere the traveller encountered profound mysteries.

A dry main was 'a secret passage;' a tank and siphon 'a royal tomb;' a disaster 'the sinister vengeance of a widowed sister and queen;' the sluices and water-wheels of a disused gate-house, 'the resting-place of crocodiles.' The '*fellah*' dreaded the rod which no longer punished the water-thief, who tapped an underground canal and fertilized his own fields at the expense of the health of a community. The Bedouin remembered the well which had once formed a distant station on some caravan route across the desert, doubly difficult or impassible since Persian jealousy or Greek ignorance had cut off its supply. Herodotus had his rivals in the construction of guide-books. He distinguished between three kinds of narrative. What he saw; what he heard and denied; and what information derived from any source, he stated for better or worse, as a mere reporter of wisdom or folly, to meet a popular and a scientific market. Therefore, he protected himself by saying: "Such as think the tales told by the Egyptians credible, are free to accept them for history; for my own part I propose throughout my whole work faithfully to record the traditions of the several nations."

In regard to Lake Moeris, his account extends into the traditional past. The officials told him that 'when Moeris was King, the Nile overflowed all Egypt, below Memphis, as soon as it rose so little as 12 feet. Now, Moeris had not been dead 900 years at the time when he heard this of the priests, yet in that day—B. C. 454—unless the river rose 24 feet, or at least 22 feet, 6 inches, it did not overflow the land.' But "Moeris" is not entitled to the final "s." "Meri" is only "river basin." The historian unfortunately labored under social disadvantages. As in the case

of the Labyrinth, he is like a visitor to Westminster in the hands of the custodian, while Strabo and Pliny, but five hundred years later, dine with the Dean and are shown antiquities by polished and learned hosts. A few verbal changes and the same passage reads: 'In the regime of the reservoirs from 2,000 to 5,000 tons per second of flow was diverted into them. The water irrigated the fields from the canals. A dyke of ten feet protected a village. For there was no danger from overflow. The desert consumed the surplus. While a hundred millions of tons per day, for double the period of beneficent Summer, watered three times the area of the present cultivated lands in the provinces of lower Egypt.'

The origin of "Meri" was traditional. The account of its size and shape are definitely assumed by the writer. Here, also, are measurements which he did not make himself, but the boatmen well knew its length and depth. It is only the work of an hour to climb the hill above Memphis to the south, and from its summit the general direction of a body of water 60 miles long and 8 to 20 wide would be sufficiently indicated by the lay of the land and its sparkle in the sun. Until within a few months this plain account has been flatly contradicted, or an attempt made to save the credit of the narrator by "the supposition that he embraced in his measurement the whole water system of the Fayoum," or had "confused units of measure," or "the direction of the canal" with that of the lake. It was said that the accounts of Herodotus (B. C. 454), Strabo (A. D. 24), Pliny (A. D. 50–70), were "widely different," and "irreconcilable;" that Moeris was "an artificial reservoir, 45 miles round, 25 feet deep at high Nile and drained at low Nile,"

when the water had been distributed over the adjacent fields. It was claimed that the position of the lake had been satisfactorily determined by M. Linant de Bellefonds. The theory of M. Jomard, who identified it with the Birket, or Lake, el-Qerun, with the depth increased by 20 or 25 feet and a moderate increase of area, was deemed refuted. "Ruins on the water's edge" showed "that its surface was at any rate never materially higher." And "though the position of Moeris was thus *satisfactorily(!)* determined, there was little or nothing to mark the ground it occupied."

The chief facts of Herodotus, in their general tenor, were repeated by Diodorus, Strabo, and Pliny. The differences are relatively minute. The discrepancies entirely disappear, if the changes of time and dynasty be considered. In place of confusion or contradiction there is an orderly series of natural alterations, substituting cultivated land for desert, or encroaching upon the lake with dykes to exclude its waters from the upper plateaux. Ptolemy, the Alexandrian geographer, gave its position by latitude and longitude, and named two towns in its neighborhood, in a very limited list. The maps which accompany his text marked a large body of water. In the sixth century it was still well enough known to indicate a town on its shore.

A condensed statement drawn from this evidence compels the belief that, of all the extant remains of antiquity in Europe, Northern Africa or Western Asia, none record such a signal and lasting victory of mind over matter as the wonderful inland sea of Egypt. Whether the concentration of human force or its wise application to a beneficent purpose was considered, the vast lake which, "owing to its size and depth, was for a thousand years capable of receiving the

superabundance of Nile water during the inundation, so that it might not wash away houses or drown the plantations of trees," bore off the palm, and this was conceded by Greek and Roman.

An intelligent Ionian, relying upon Herodotus in the fourth century, B. C., would have understood that a great reservoir of unequal depth, extended from northeast to southwest, nearly parallel with the Nile Valley, a short distance to the south and west of Memphis. Its surface multiplied by the height of the inundation equalled a considerable part of the volume of the excess of Nile water from June to January. Its shore line of 450 miles wound along sandy bays and under steep headlands. It was measured by the boatmen as sixty days' journey. The blue water was full of fish. Twenty-two kinds found a *habitat* in the various conditions it presented, from a sheer depth of 300 feet and rocky bottom, to canals, marshes, and reedy pools oftentimes thickly impregnated with salt. Its canal of supply became also an artificial outlet. Natural drainage contributed to lower its waters. When full it was above the cultivated land and in case of need furnished water to irrigate a large area of the Valley. If this Greek had lived in the days of Euripides or Aristotle he would have correctly supposed that no considerable population dwelt on the margin of the lake. If he were a contemporary of Cleopatra, the fame of olives, wine and roses would have instructed him in the change which had taken place on an upper plateau. If he supplemented the earlier author by Eratosthenes or Hipparchus, or purchased a copy of Strabo, he would have easily understood how the edge of the lake, like the margin of the sea shore,

was protected by dykes against the water of the canals which skirted it on one side and the lake which bounded it on the other. Had he travelled with Pliny, he would have noted with the quick eye and indefatigable pen of the Roman Admiral, not only that the water no longer rose after the inundation high enough to pour back into the valley, and that the lake was only 250 miles in circumference, but his attention might have been directed to the purpose of defense which it still served. For it stretched as a huge moat, protecting on the west the immense wealth of which Alexandria had been unable wholly to deprive her vanquished rival Memphis. If he purchased a map, as Aelius Aristides says that he did, about A. D., 180, the lake had shrunk to still smaller dimensions. The annual supply was reduced below what evaporation or underground percolation could dissipate. And if in the fifteenth century in the Carmelite monastery of Venice one had asked Fra Mauro what remained of the great sea, he would have been referred to two small pools which scarcely attract attention even upon the large map, prepared, in a seaport a few days' sail from Alexandria, by men to whom Egypt was personally familiar.

Turning from these ancient accounts to the accompanying map, there is no difficulty in perceiving that a body of water might pass by the Bahr Yusuf at low Nile, or directly from the submerged valley at Benisuef during the late Summer and early Autumn, to the West, where El-Lahun marks the commencement of the lateral canal, and limits with a dyke the amount of the flow. Seven feet is the usual difference between the water above and below it at low Nile. A fall of ten feet carries the

water through the town of Medinet el-Fayoum, marked as a small square + 75. A large part has already been diverted. One branch running northward to the Kasan or pond of Tamieh, falls over a dam about thirty feet high into a deep cut between the limestone walls leading westward to the Lake. The canal to the south, falling fifty feet in twenty miles, turns undershot millwheels and loses itself in a plain, where old vineyards and Bedouin tents, fortified towns and Arab villages are still subject to capricious changes, indicated by the name of Gharaq, or the deluge. Desert, lake, field, canal and village shift their respective places, to the utter confusion of the cartographer.

The channel which, passing to the south round the dyke of the 'Moeris of M. Linant,' winds west and north across the 'Moeris of Jomard,' is a principal affluent of the Lake El-Qerun. It enters it over a flat, marshy shore, covered with bushes or low trees of tamarisk, and forming border land useless for cultivation. Opposite its mouth – 160 shows that, like the Dead Sea, the surface is below the Mediterranean. If to the + 85 of El-Lahun be added 30 to 50 feet for the depth of water, it gives more than the 50 paces of Pliny and about the 50 fathoms of the Greeks. Dimeh + 90 is above Wasta, and therefore its "street of lions" would not be submerged if the entire basin were filled. Qasr Qerun, to the south, would be under water. But even Hadrian, A.D. 130, may not have seen its temple. It is late in style and offers no difficulty. It is in the latitude and longitude given by Ptolemy for Moeris itself. Jomard thought it marked its southern extremity. But an ancient canal, until a recent period, conducted the water round the high, flat peninsula, which, 200 to 225

feet above the sea, separates it from the shallower basin of Gharaq. A 'Gisr' or embankment stretches across the entrance to the Wadi Moïeh and Reian. If the water were carried round the point, a depth equal to the northern basin could be obtained under the brow of the hill, where – 180 is near + 225. That valley is closed to the southwest by steep slopes of sand. The wall becomes more abrupt as it passes northward behind the Heram or Pyramid Meruet el-Berl—"the Meri of the Mule"(!).

Except in a bay of doubtful extent near Dimeh and a narrow gorge towards Oxyrhinchus, there are three well-defined basins, which, if the dyke at El-Lahun should give way and remain unrestored, would offer a sheet of water of the circumference and direction of "Meri," and in depth, color, purpose and elevation above the Delta, exactly fulfilling all requirements.

The map, however, differs from all other maps of this part of Egypt, in the most essential particulars. It owes its existence to the assumption that the descriptions of Lake Moeris were correct. Taking the original words in their natural sense, the measurements, maps and terms in the spirit of the age for which they had been made; acknowledging the competence of Strabo and Pliny to pronounce between the aqueducts of Rome and of Memphis, the temples of Ephesus and Karnak; preferring the calm and just appreciation of these experienced men of the world to the unscientific outbursts of mere students and *doctrinaires;* the unchallenged accounts of officers and gentlemen of the highest standing, to the narrow experience of a local engineer, pronouncing everything impossible which his mind could not grasp or his means execute—any other map but

this presents insuperable obstacles. It is, therefore, indispensable to show the errors of previous cartographers and the material from which this was composed.

The maps prior to 1765 are a most interesting study.* A minute examination of upwards of a hundred, on papyrus and parchment, in fresco and in print, hieroglyphic and conventional, Egyptian, Greek, Latin, Arabic and Italian, yielded most valuable results. Whatever may appear to the contrary in the works of distinguished Egyptologists, these do not contradict the plain statement of the ancient authors, or offer any support to the hypothesis of M. Linant de Bellefonds. The beautiful work of the accomplished D'Anville, in 1765, was rather the expression of refined scholarship than of sound cartography. The forty-seven great sheets in which the *savants* attached to the French invading army recorded the route which it traversed and the region which it occupied on the Nile and in Syria, are of very unequal value. Splendid specimens of engraving, skilfully devised to cover the imperial retreat, they served with the accompanying text to convert strategic defeat into scientific victory. Jacotin and Jomard wore the laurels which Acre denied to Bonaparte, and the assassin's dagger to Kleber. But when the eye rests upon square yards covered with dots placed with great technical skill to represent the desert, the observer, who remembers that its importance is confined to a comparatively small part of the surface included within the four corners of many sheets, is tempted to regret this prodigality. Unfortunately there is little to

* The Society possesses, in its Bulletin No. 1, 1879, a learned and exhaustive *resumé* of the early history of cartography by its President. It is not, therefore, necessary to repeat the facts there stated.

show where the theodolite rested and the burin proceeded alone. From the most conscientious and thorough survey, based on a careful triangulation of well-known points, to the report of an Arab, imperfectly understood and erroneously transcribed, or, from the accurate drawing of a building, measured in all its parts, to a hasty pencil sketch and guess at dimensions, this material was worked up in Paris, and although it furnished an exhaustive treatment of much of the area of Egypt, and especially of the cultivated part of the Fayoum, it was strangely inadequate and perplexing in its record of positive error.

A colored map of Lower Egypt, on a scale of 1:200,000, was published by Brockhaus in Leipsig in 1876. The names are printed in Arabic. It was the work of Mahmoûd Pacha, and embraced a large number of astronomical observations. He surveyed the neighborhood of Lake Mareotis for the "Cæsar" of Napoleon III., but adopted the French map beyond the area of cultivated land to the south of Alexandria.

In 1822 Mohammed Ali had instituted, under an Italian, Mazi, a survey of certain parts of Lower Egypt. The results, however, were mislaid or lost. In 1879 a special department was formed to carry out a similar work, and the '*cadastre*' has since been engaged, with engineers of every nationality, in plotting the estates of peasants and nobles with a view to a readjusted and more equitable incidence of taxation.

The map of the Fayoum, published in 1859 in the Denkmäler aus Ægypten, was directly due to M. Linant de Bellefonds. This French engineer, in the service of the Khedive, says (Mémoires, 1872–3, p. 492,) that an accurate map, 1:10,000, was executed by a European engineer under his

direction. It met with a series of misfortunes and passed into oblivion. But in 1843 the Société Egyptienne of Cairo published a *mémoire* on Lake Moeris, with a map 1:250,000. Lithographed in Cairo, and with discreditable carelessness, it was the source from which the scientific world obtained its information for over a quarter of a century. It was not so much a map of the Fayoum as a sketch to show that there had been a reservoir on the upper plateau formed by two dykes on the north, west and southwest, and by the Sedment range on the east, which M. Linant called Moeris, and substituted for that described by the Greek historians who saw it, and the Alexandrian cartographers who sketched its shape and fixed its position. It contained a section which will always possess an interest as showing the possible aberration of a professional engineer of the highest standing and undisputed integrity. It is this line of levels, run at some unknown period prior to 1842, which is alone responsible for the thousand-times repeated error that the Birket-el-Qerun is about the level of the Mediterranean. In 1854, a 'Carte Hydrographique de la Moyenne Egypte' reproduced this map. In 1859, Lepsius, with the skillful aid of German engravers and the misplaced liberality of the Court of Berlin, not only perpetuated these blunders, but lent the weight of his personal authority to errors so obvious that it is utterly inconceivable how he could have been thus deceived. Necessarily, during this period and prior to 1872, countless reproductions of varying pretensions were uttered by European map-makers. Having myself examined them by scores, it proved curious and easy to group them by blunders into families. The date of a map, like that of a cursive MSS., proves but little.

Figari Bey, in 1864, published "Etudes Géographiques et Géologiques de l'Egypte, de la Péninsule de l'Arabie Petrée et de la Palestine." No cabinet geognostic ever produced less accurate results than Sections 6, 7 and 8. The "clayey limestone" follows the graceful curves of the hills, or offers a shelter to the pyramids of "Zakarah." The stately Italian sentences lend themselves, with equal disregard of geological laws, to picturesque description of scenery, evidently borrowed from M. Linant or the rapid march of Gen. Andreossy, Pluviose, an 7 (Jan., 1799).

In 1870–73, Linant Pacha issued in Paris, at his own expense, a very costly work, entitled "Mémoires sur les Principaux Travaux d'Utilité Publique Exécutés en Egypte," text and atlas; Arthus Bertrand, *éditeur*. It resembles the publication of Prisse d'Avennes only in its technical finish. Respect for age and personal worth limit legitimate criticism to the bare statement that it has no interest beyond the Fayoum. The map is little more than a repetition of the old sketch of 1843. The canals and basins are laid down with a reasonable approximation to truth. The towns and villages are incorrectly named and placed. A capital sin of omission to the north is the great dyke so conspicuous near Tamieh. To the south and west the chromolithographer, stimulated by the yellows and greens of Figari, flung across the lofty and monotonous table-land of Jacotin's engraver, crimson and dark-gray masses, while a thick cloud upon the mount "Medaïé el-Hebgad" of d'Anville justifies the terrors which, according to Brugsch, the "nameless nome" of Egypt inspired in the breast as well of the Theban Hume as the Memphite Macaulay. But the section through Medinet-el-Fayoum is in striking

contrast, not only to the nebulous hues into which the sun of observation sets, but to that pretentious little profile by which Lepsius had too successfully sought to show that 'excavation' was to be interpreted 'wall,' and "fossa grandis" translated "a shallow reservoir." This corrected section, however unfair, forced, inaccurate and palpably erroneous, showed that the 'great and ancient dyke' of Lake Moeris, and the present dyke of El-Lahun kept the waters of the Bahr Yusuf out of a deep erosion, which, in a single year, would otherwise be filled to a depth neither more than the fifty fathoms (300 feet) of the Greek geographers nor less than the fifty paces of the Roman Admiral.

The text inserts in certain places corrections which correspond to these changes, but the discoverer, or rather inventor, of Moeris had too much regard for the reputation of the Egyptologists who had accepted his statements, and the momentum of a scientific error of great specific gravity, passing with velocity through innumerable channels of thought, to draw attention to the *errata*, or change his syllogism because Rousseau Bey and a sugar railway had converted his minor premiss into its contradictory opposite. For, about 1871, the present Director of Public Works was requested by Ismaïl Pacha to examine the Lake el-Qerun with a view to draining it. He reported this impossible, because it was about 200 feet below the level of the Mediterranean. In February, 1880, the *Gesellschaft für Erdkunde*, of Berlin, published a map drawn by Dr. G. Schweinfurth, with a section whose elevations vary from those of Linant, but only to give more striking confirmation to the technical accuracy of Herodotus, Diodorus, Strabo and Pliny. Its

Zeitschrift, of May, contains a description of the map, and valuable information on collateral points. Petermann's Mittheilungen, 1880, probably obtained from it the – 42*m*. which appears in *T*.9. from which Junker's route was taken for the map printed herewith. In 1881, L. Olyphant had noticed this singular fact, but neither these distinguished authors nor their reviewers were led to modify their agreement with the location assigned to the ancient lake in Linant's memoir of 1843. The discovery of this error in level, in September, 1881, stimulated me to fresh exertions, and justified me in disregarding both the French and German authorities. It seems strange that neither in the British Museum nor the Royal Geographical Society, in the *Bibliothéque Nationale* and at the *Société de Géographie*, in the shops of London, Paris, Alexandria and Cairo, was any clue or hint given me of the two maps of 1880. To Dr. Schweinfurth himself, whose kind attentions I am anxious to acknowledge in the fullest manner, I owed *after* my return from my first exploration the suggestions which enabled me to affirm my own conjectures and their realization.

It may be taken as an admission of ignorance, but it cost me months of time and a very considerable amount of trouble to get together the few sheets and volumes which I now feel fairly sure represent all the latest information. A map of $\frac{1}{40000}$, traced by me from the original in the possession of Rousseau Bey, the field books of M. Julliot, the maps of the *Cadastre* in the Government House at Medinet el-Fayoum, days and nights spent with M. Stadler at Minieh, invaluable discussions with Col. Mason Bey, Chief of the *Cadastre* in the Fayoum, the privilege of unrestricted inter-

course with Lieut. Gen. Stone Pacha, also our countryman, are only a part of the efforts made to arrive at the truth. Having, according to Dr. Schweinfurth, been the first European who visited the "Heram," south of Qasr Qerun, and "affirmed, in March, the existence of a depression to the south of the Fayoum which might serve as a waste-weir for the excess of the Bahr Yusuf," I applied to the Egyptian Government for an engineer to run a line of levels through lat. 30°, intending to cross the desert to Junker's track, and push on far enough West to dispose of the question whether Moeris had extended to the north of the Fayoum, with such ancillary points as the site of Bacchis—a town or strategic position of the first rank in Roman days—the character of the desert, and especially traces of those "Fountains of the Sun" which I believed had existed, and which would have been formed by water following the limestone and rising to the surface through the crevices into the hollows or oases. If, however, an Arabian monarch had, as Herodotus reported, anticipated the pipe lines and flumes of our oil wells and silver mines, and conducted water through leather mains for several hundred miles, it was possible that Roman garrisons and commercial stations had marked and facilitated such routes as that towards Carthage, obtaining water from Moeris, but by artificial means. Then returning southward to the Fayoum, and sending in for fresh supplies, if all went well it would have been possible to examine remains of which I had heard from the Copts of Senhur and the Bedouins of Gizeh, said to lie to the west of Lake el-Qerun, and at all events follow the limestone chain, and close forever the gaps marked to the southwest. Stone Pacha,

Chief of Staff, at once proceeded to organize an expedition, placed an engineer at my disposal, selected soldiers, repaired instruments, and as the *Khamsin*, or period of hot winds, was rapidly approaching, hastened preparations so that in less than five days all would have been completed. Arabi Pacha, although he had approved the enterprise and sanctioned the expedition, interposed obstacles. The war was imminent. It is quite possible that, in all kindness, he foreboded for me a fate like that of Professor Palmer. Having determined to go, it was intimated that it must be alone, and consent to take a French engineer was refused. A well-known and very skillful Englishman, Mr. W. F. Petrie, had been long engaged in surveys on the Gizeh plateau. I met him there by accident the night before my departure. He at once agreed to give me two full days. Starting at daybreak, with all the necessary instruments, he surveyed from the summit of Kom el-Kashab, in the valley below, at camp to the south, and on the ridge west of Memphis, and mapped the portion which includes the Wadi Fadhi. The *double* valley, apparently marked by Jacotin and repeated by Mahmoud, has been effaced from the latest maps. This was thought "a new and valuable addition to the cartography of Egypt" because, without doubt, in this direction the underground escape of water took place, filling the lakes in the Natron Valley. With a head of about 100 feet, the water, which now only oozes after many months, would have abundantly supplied the entire district, called Scythiaca (from Shet), or Marmarica (from Meri), the two equivalent terms for the vast lake 40 miles to the south.

In fulfillment of my promise to him, I returned with Mr. Petrie to Sakkara, and arranged with Mr. Ellis, artist,

author and engineer, with the valuable experience of a journey across the Syrian Desert, for a week to be passed in following the contour of the Fayoum basin, on the east, north and west. It was primarily with me a search for the Labyrinth, and an examination of the reputed remains of ancient civilization, so as to dispose of the fatal objection made by Jomard, and repeated by the very latest writers, that the Arsinoïte nome with fruitful fields and splendid edifices had, from before the first Olympiad to the Middle Ages, occupied the plateau which on the map separates the 'Moeris of Jomard' from the 'Moeris of M. Linant.' It was especially important to strike into the desert to the north, and coming back to the lake, take soundings, visit Dimeh, to determine its age and elevation, and the island, with remains, which my Arab companions had called the palace of Haroun. We accomplished this. The map, however, scarcely shows even to an expert the minute changes which ought to be made, for this part had been triangulated with reasonable accuracy. At the edge of the lake, Mr. Petrie again joined me. Returning to Medinet, the obelisk of Ebgig and the alleged 'pyramids' (!) of Biha-mu were measured and photographed. Starting again on camels, traversing and examining for the third time the dyke towards Gharaq, we spent the night of April 4 under a steep cliff in the Wadi Reian. The old water-line was plainly visible. Repeated observations with an excellent aneroid, the geological formation and outcrop, and surveys with a theodolite, left no doubt that the southwest basin is substantially as marked. When subsequently plotted, and the western limit filled in to the north from my own previous desert ride of twenty hours, and to the

south from the travels of Mason Bey, Calliaud and Belzoni, it was evident that this basin was the Lacus Meridis of Cl. Ptolemy. Apart from its practical value to the engineer, the archæologist gladly accepted a strong proof that the maps attached to the text printed in Rome were drawn prior to the Arab invasion in the seventh century. Whether the valley extends as far towards Oxyrhincus, as it appears on those maps, or whether the transcriber, mistaking the long gorge for the canal of supply, somewhat exaggerated it, was a tempting problem, which, after fruitless efforts to secure the necessary assistance, was left with the assurance that it would be determined, if not sooner, at least when M. Maspero, so skillful and thorough, makes Behnesa a point of departure for his projected examination of that most important district. Two months afterwards, in Paris, however, I found in the *Zeitschrift* g. f. E., 1880, p. 160, in the concluding passage of Dr. Schweinfurth's notes on his map: "According to Ascherson's observations, the following are the elevations of points within the area of this map of the Fayoum: Benisuef, 28*m*. (91 feet) *above* the sea; Medinet el-Fayoum, 23*m*. (75 feet); the town near Gharaq, 2*m*. (6½ feet); Valley of Reian, at the edge of the desert plateau southwest of Gharaq, 29*m*. (95 feet) *below* the level of the Mediterranean," and therefore 57*m*. (188 feet) *below* the level of the Nile.

These observations, therefore, prove, it seems, beyond possibility of error, that the accounts of the ancient historians are entirely credible, and that the Meridis Lacus of the later Roman age might be reconstructed without great expense, and furnish at least a waste-weir for the Bahr Yusuf and the Nile.

The Bahr Yusuf was at one time, in part of its course, the principal stream. It has always been a natural branch of the river, artificially controlled, rather than a canal. Whether before 'Cambyses, son of Cyrus,' it flowed through the Labyrinth, as I have conjectured, with inference and argument drawn from innumerable sources and strangely corroborative, at all events, after the Persian invasion to the Ptolemaic *renaissance*, no effort appears to have been made to control it at the gorge near Wasta. Like the Albert Nyanza to the south, Moeris simply served as a vast natural receptacle for a considerable part of the annual flood. The Greek or Roman engineers subsequently barred the entrance, and with double canal and sluices stored up and distributed the excess. The later empire permitted the inhabitants of the Fayoum to encroach upon the lake. The canal was tapped at a hundred points in its course of 207 miles. The water which reached El-Lahun was easily diverted to the river. The extreme fertility and large population of the northern depression present the most striking contrast to the utter desolation of the Wadi to the south. It demonstrates that during the early centuries of our era the southern basin was able, to a partial extent, in the words of Strabo, "to receive the superabundance of water which flowed into it at the time of the rise of the river, without overflowing the inhabited and cultivated parts of the country." It prevented such disasters as the recent destruction of the village of Gizeh and the deplorable loss of many hundred lives; it protected the Fluvius Trajanus, the Cairo-Suez canal of the day. The supply of water to the Fayoum, having thus been rendered completely artificial, appears to have reached its lowest point about twenty

years ago. Since that time, a change made near Siût, and the removal of silt from the bed of the canal, have effected an enormous increase in the volume which pours into the Birket el-Qerun. Apart from the danger of a deluge, to which 150,000 souls are now exposed every summer, even during low Nile, the lake increases at the rate of more than an inch in each winter month. The water of the lake is no longer too salt to drink even off the Western shore. It calls for prompt action against the continual menace of an appalling catastrophe, and the steady and rapid destruction of valuable land. On every account, therefore, my 'investigations should be turned to practical account' and a survey made, without delay, of the Wadi Moiëh, the exact height of the 'Gisr' determined, the old canal towards the Qasr Qerun reopened, the surplus of the inundation diverted through it into the Wadi Reian, and the present lake reduced to its mediæval proportions.

Is there not also a lesson for the New World? Ought not the Mississippi to be treated like the Nile? The engineers who derive their technical education in geometry from the builders of the Pyramids can afford to accept instruction in hydro-dynamics from the Pontiffs of Lake Moeris.

REMARKS BY CHIEF-JUSTICE DALY,

President of the Society.

Mr. Whitehouse's paper is a valuable one upon an exceedingly interesting subject. It shows that he has made a careful study of the locality where the indications, if any now exist, of the great artificial lake described by Herodotus, Diodorus Siculus and Pliny, ought to be found; and the geographical features stated by him are set forth with such detail and minuteness, that I assume them to be accurate and reliable. This lake, as Herodotus describes it, was of such magnitude, and showed such an advance in the knowledge of engineering, that perhaps we ought not to be surprised that Herodotus's account of it should heretofore have been questioned, although describing, not what he heard, but what he saw himself.

Until a comparatively recent period, this and many other statements by the "Father of History" have been treated as doubtful or incredible; but the investigations of the last half century, instead of confirming these doubts, have resulted in the discovery of facts that show him to have been one of the most careful and reliable of narrators; one who, as Mr. Whitehouse has observed, always distinguishes between what he saw, what he heard and what he believed.

His account of Lake Moeris is so circumstantial and particular, that Mr. Whitehouse started, in his investigation, very properly, in my judgment, upon the assumption that his statement was true; and made it the primary object of

his examination, to ascertain whether there was anything in the geographical features of the country that rendered the existence of an artificial lake, of such magnitude, questionable or impossible.

This was a more correct course than that pursued by the previous investigators, Messrs. Linant and Jomard, who, having found depressions and a configuration of the surface sufficient to create a lake, fixed upon what they found as the true site of this artificial basin, without troubling themselves whether it would or would not meet the requirements which the description of Herodotus demands.

It is manifest that neither of the specific localities fixed upon by them as the bed and boundaries of this ancient basin will satisfy the required conditions; while the important fact ascertained by Mr. Whitehouse, of a large depression at the south, will substantially do so, upon the facts which he presents, assuming them, as I do, to be accurate. Mr. Whitehouse, moreover, included in the examination of this question, what was very essential, an examination of all the cartographical evidence, from the time of Ptolemy; and what is of especial value in his paper is his calling our attention to the errors that abound in the modern and comparatively recent maps of this part of Egypt, upon which reliance would naturally be placed—errors so numerous, that they may, as he expresses it, be grouped together in families.

Mr. Whitehouse's labors add another to the many proofs that have recently accumulated of the truthfulness and accuracy of Herodotus; and the existence of such a stupendous work as the one described by him, shows that, in our estimate of what the Egyptians could and did do, it is

not in exaggerating that we are likely to err, but in not sufficiently appreciating what they were able to accomplish.

I feel that the Society is much indebted to Mr. Whitehouse for this interesting paper, and I trust that the condition of things in Egypt will, ere long, be such as to bring about a survey of this neglected region, not merely to gratify curiosity in respect to its past condition, but to point out the means of guarding against results from the action of the Nile, which at no very distant day may prove to be, in this part of Egypt, most calamitous.

APPENDIX.

[The following descriptions of Lake Moeris are taken, without change, from the standard translations of the respective authors.]

PLINY, A. D. 47.—Between Arsinoïtes and Memphites, a lake 250 miles, or according to what Mucianus says, 450 miles in circumference and 50 paces deep, has been formed by artificial means: after the King by whose orders it was made, it was called by the name of Moeris. The distance from thence to Memphis is nearly 62 miles, a place which was formerly the citadel of the Kings of Egypt. Memphis is 15 miles from the spot where the river Nile divides into the different channels which we have mentioned as forming the Delta.—Pliny's "Natural History," Book V., c. 9., Vol. I., p. 409.

(And there are) two (pyramids) in the place where Lake Moeris was excavated, an immense artificial piece of water, cited by the Egyptians among their wondrous and memorable works: the summits of the pyramids, it is said, are to be seen above the water.—Book XXXVI., c. 16, Vol. VI., p. 336.

HERODOTUS, BOOK II. (RAWLINSON'S TRANSLATION), B. C. 454.—"The Egyptians told me that the first man who ruled over Egypt was Mên, and that in his time all Egypt, except the Thebaic canton, was a marsh, none of the land below Lake Moeris then showing itself above the surface of the water. This is a distance of seven days' sail from the sea up the river.—Chap. 4.

"The crocodile is esteemed sacred by some of the Egyptians, by others he is treated as an enemy. Those who live near Thebes, and those who dwell around Lake Moeris, regard them with especial veneration. In each of these places they keep one crocodile in particular, who is taught to be tame and tractable.—Chap. 69.

"The priests said that Mên was the first King of Egypt, and that it was he who raised the dyke which protects Memphis from the inundations of the

Nile. Before his time the river flowed entirely along the sandy range of hills which skirts Egypt on the side of Libya. He, however, by banking up the river at the bend which it forms about a hundred furlongs south of Memphis, laid the ancient channel dry, while he dug a new course for the stream halfway between the two lines of hills. To this day, the elbow which the Nile forms at the point where it is forced aside into the new channel, is guarded with the greatest care by the Persians and strengthened every year; for if the river were to break out at this place and pour over the mound, there would be danger of Memphis being completely overwhelmed by the flood. Mên, the first King, having thus, by turning the river, made the tract where it used to run, dry land, proceeded in the first place to build the city now called Memphis, which lies in the narrow part of Egypt; after which he excavated a lake outside the town, to the north and west, communicating with the river, which was itself the eastern boundary.—Chap. 99.

"Bent on avenging the death of her brother, Nitocris devised a cunning scheme by which she destroyed a vast number of Egyptians. She constructed a spacious underground chamber, and, on pretence of inaugurating it, contrived the following:—Inviting to a banquet those of the Egyptians whom she knew to have had the chief share in the murder of her brother, she suddenly, as they were feasting, let the river in upon them, by means of a secret duct of large size This, and this only, did they tell me of her, except that when she had done as I have said, she threw herself into an apartment of ashes, that she might escape the vengeance whereto she would otherwise have been exposed.

"The other Kings, they said, were personages of no note or distinction, and left no monuments of any account, with the exception of the last, who was named Mœris. He left several memorials of his reign—the northern gateway of the temple of Vulcan; the lake excavated by his orders, whose dimensions I shall give presently, and the pyramids built by him in the lake, the size of which will be stated when I describe the lake itself wherein they stand. Such were his works: the other Kings left absolutely nothing.—Chap. 100 and 101.

Sesostris made "use of the multitudes whom he had brought with him from the conquered countries, partly to drag the huge masses of stone which were moved in the course of his reign to the temple of Vulcan—partly, to dig the numerous canals with which the whole of Egypt is intersected. By these forced labors, the entire face of the country was changed; for, whereas Egypt had formerly been a region suited both for horses and carriages, henceforth it became entirely unfit for either. Though a flat country throughout its whole extent, it is now unfit for either horse or carriage, being cut up by the canals, which are extremely numerous and run in all directions. The King's object was to supply Nile water to the inhabitants of the towns situated in the midcountry, and not lying upon the river; for previously they had been obliged, after the subsidence of the flood, to drink a brackish water which they obtained from the wells.—Chap. 108.

"In what follows, I have the authority, not of the Egyptians only, but of

others also who agree with them. I shall speak likewise in part from my own observation. When the Egyptians regained their liberty after the reign of the priest of Vulcan, unable to continue any while without a king, they divided Egypt into twelve districts, and set twelve kings over them. Now, the twelve held their meetings at all the temples. To bind themselves yet more closely together, it seemed good to them to have a common monument. In pursuance of this resolution they made the Labyrinth which lies a little above Lake Moeris, in the neighborhood of the place called the City of Crocodiles. I visited this place and found it to surpass description; for if all the walls and other great works of the Greeks could be put together in one, they would not equal, either for labor or expense, this Labyrinth; and yet the temple of Ephesus is a building worthy of note and so is the temple of Samos. The Pyramids likewise surpass description, and are severally equal to a number of the greatest works of the Greeks, but the Labyrinth surpasses the Pyramids. The upper chambers I, myself, passed through and saw; of the underground chambers I can speak only from report; for the keepers of the building could not be got to show them, since they contained (as they said) the sepulchres of the kings who built the Labyrinth, and also those of the sacred crocodiles. The upper chambers, however, I saw with my own eyes, and found them to excel all other human productions.

"Wonderful as is the Labyrinth, the work called the Lake of Moeris, which is close by the Labyrinth, is yet more astonishing. The measure of its circumference is sixty schœnes or three thousand six hundred furlongs, which is equal to the entire length of Egypt along the sea-coast. The lake stretches in its longest direction from north to south, and in its deepest parts is of the depth of fifty fathoms. It is manifestly an artificial excavation, for nearly in the centre there stand two pyramids, rising to the height of fifty fathoms above the surface of the water and extending as far beneath, crowned each of them with a colossal statue sitting upon a throne. Thus these pyramids are one hundred fathoms high, which is exactly a furlong (stadium) of six hundred feet: the fathom being six feet in length, or four cubits, which is the same thing, since a cubit measures six, and a foot four, palms. The water of the lake does not come out of the ground, which is here excessively dry, but is introduced by a canal from the Nile. The current sets for six months into the lake from the river, and for the next six months into the river from the lake. While it runs outward it returns a talent of silver ($1,200) daily to the royal treasury from the fish that are taken, but when the current is the other way, the return sinks to one third of that sum.

"The natives told me that there was a subterranean passage from this lake to the Libyan Syrtis, running westward into the interior by the hills above Memphis.

"As I could not anywhere see the earth which had been taken out when the excavation was made, and I was curious to know what had become of it, I asked the Egyptians who live closest to the lake where the earth had been put. The answer that they gave me I readily accepted as true, since I had heard of the same thing being done in Nineveh of the Assyrians. There, once upon a

time, certain thieves having formed a plan to get into their possession the vast treasuries of Sardanapalus, the Ninevite King, which were laid up in subterranean treasures, proceeded to tunnel a passage from the house where they lived into the royal palace, calculating the distance and the direction. At nightfall they took the earth from the excavation and carried it to the River Tigris, which ran by Nineveh, continuing to get rid of it in this manner until they had accomplished their purpose. It was exactly in the same way that the Egyptians disposed of the mould from their excavation, except that they did it by day and not by night; for as fast as the earth was dry, they carried it to the Nile, which they knew would disperse it far and wide. Such was the account which I received of the formation of this lake."—Chaps. 149, 150.

"The other is an improbable story, but as it is related, I ought not to pass it by. There is a great river in Arabia called the Corys, which empties itself into the Erythræan Sea. The Arabian king, they say, made a pipe of the skins of oxen and other beasts, reaching from this river all the way to the desert, and so brought the water to certain cisterns which he had had dug in the desert to receive it. It is a twelve days' journey from the river to this desert tract, and the water, they say, was brought through three different pipes to three separate places."—III., 9.

Diodorus, the Sicilian. Translated by G. Booth. London, 1814.

After the death of this King and twelve descents, Meris came to the crown of Egypt, and built a portico in Memphis, toward the north, more stately and magnificent than any of the rest. And a little above the city he cut a dyke for a pond, bringing it down in length from the city three hundred and twenty-five furlongs, whose use was admirable, and the greatness of the work incredible. They say it was in circuit three thousand and six hundred furlongs; and in many places three hundred feet in depth. Who is he, therefore, that considers the greatness of this work, that may not justly ask the question—How many ten thousand men were employed, and how many years were spent in finishing it? Considering the benefit and advantage (by this great work) brought to the government, none ever could sufficiently extol it, according to what the truth of the thing deserved. For being that the Nile never kept to a certain and constant height in its inundation, and the fruitfulness of the country ever depended upon its just proportions, he dug this lake to receive such water as was superfluous, that it might neither immoderately overflow the land, and so cause fens and standing ponds, nor by flowing too little, prejudice the fruits of the earth for want of water. To this end he cut a trench along from the river into the lake, four score furlongs in length, and three hundred feet broad; into this he let the water of the river sometimes run, and at other times diverted it, and turned it over the fields of the husbandmen, at seasonable times, by means of sluices which he sometimes opened, and at other times shut up, not without great labor and cost; for these sluices could not be opened or shut at a less charge than fifty talents. This lake continues to the benefit of the Egyptians for these purposes to our very days, and is called the lake of Myris or Meris to this day. The King left a place in the middle of the lake, where he built a sepulchre and two pyramids, one for him-

self, and another for his Queen, a furlong in height; upon the top of which he placed two marble statues seated in a throne, designing, by these monuments, to perpetuate the fame and glory of his name to all succeeding generations. The revenue arising from the fish taken in this lake, he gave to his wife to buy her dresses, which amounted to a talent of silver every day. For there were in it two-and-twenty sort of fish, and so vast a number were taken, that those who were employed continually to salt them up (though they were multitudes of people), could hardly perform it. And these are the things which the Egyptians relate of Meris.—Vol. I., Chap. IV., p. 56.

STRABO by FALCONER and HAMILTON.

"In like manner the borders of the Lake Moeris resemble a sea-beach, rather than the banks of a river."—I. p. 179.

"The attention and care bestowed upon the Nile is so great as to cause industry to triumph over nature. The ground by nature, and still more by being supplied with water, produces a great abundance of fruits. By nature also a greater rise of the river irrigates a larger tract of land; but industry has completely succeeded in rectifying the deficiency of nature, so that in seasons when the rise of the river has been less than usual, as large a portion of the country is irrigated, by means of canals and embankments, as in seasons when the rise of the river has been greater. Before the times of Petronius there was the greatest plenty, and the rise of the river was the greatest when it rose to the height of fourteen cubits; but when it rose to eight only, a famine ensued. During the government of Petronius, however, when the Nile rose twelve cubits only, there was a most abundant crop; and once when it amounted to eight only, no famine followed. The country above the Delta is irrigated in the same manner, except that the river flows in a straight line to the distance of about four thousand stadia in one channel, unless where some island intervenes, the most considerable of which comprises the Heracleiosic nome; or where it is diverted by a canal into a large lake, or a tract of country which it is capable of irrigating, as the Lake Moeris and the Arsenoïte nome, or where the canals discharge themselves into the Mereotis.—III., p. 223.

Next is the Aphroditopolite nome. Then follows the Heracleote nome, in a large island, near which is the canal on the right hand, which leads into Libya, in the direction of the Arsinoïte nome; so that the canal has two entrances, a part of the island on one side being interposed between them.

(NOTE.—This passage presents great difficulties. Kramer expresses himself dissatisfied with any explanation hitherto given. Und so dass der Kanal zwei Mündungen hat, zwischen welchen ein Theil der Insel seitwärts fällt. Groskurd. [cum pars quædam insulas intercidat.]) P. 253.

This nome is the most considerable of all in appearance, natural properties and embellishment. It is the only nome planted with large, full-grown olive trees, which bear fine fruit. (The rest of Egypt is without the olive tree, except the gardens near Alexandria, which are planted with olive trees, but do not furnish any oil.) It produces wine in abundance, corn, pulse, and a great variety of other grains. It has also the remarkable Lake Moeris, which

in extent is a sea, and the color of its waters resembles that of the sea. Its borders also are like the sea-shore, so that we may make the same suppositions respecting these as about the country near Ammon. For they are not very far distant from one another and from Parætonium; and we may conjecture from a multitude of proofs, that as the temple of Ammon was once situated upon the sea, so this tract of country also bordered on the sea at some former period. But lower Egypt and the country as far as the Lake Sirbonis were sea and confluent perhaps with the Red Sea at Heroopolis, and the Ælanitic recess of the gulf.

The Lake Moeris, by its magnitude and depth, is able to sustain the superabundance of water which flows into it at the time of the rise of the river, without overflowing the inhabited and cultivated parts of the country. On the decrease of the water of the river, it distributes the excess by the same canal at each of the mouths; and both the lake and the canal preserve a remainder which is used for irrigation. These are the natural and independent properties of the lake, but in addition, on both mouths of the canal are placed locks, by which the engineers store up and distribute the water which enters or issues from the canal. We have here also the Labyrinth, a work equal to the Pyramids. P. 255.

Sailing along to the distance of 100 stadia we come to the City Arsinoe, formerly called Crocodilopolis; for the inhabitants of this nome worship the crocodile. The animal is accounted sacred, and kept apart by himself in a lake; it is tame, and gentle to the priests, and is called Suchus. P. 256.

In the latitude of Abydos is the first Auasis (Oasis), of the three which are said to be in Africa. It is distant from Abydos a journey of seven days through a desert. It is an inhabited place, well supplied with good water and wine, and sufficiently provided with other articles. The second is that near the Lake Moeris. The third is that at the oracle of Ammon. P. 258.

See also the following papers by Mr. F. Cope Whitehouse:

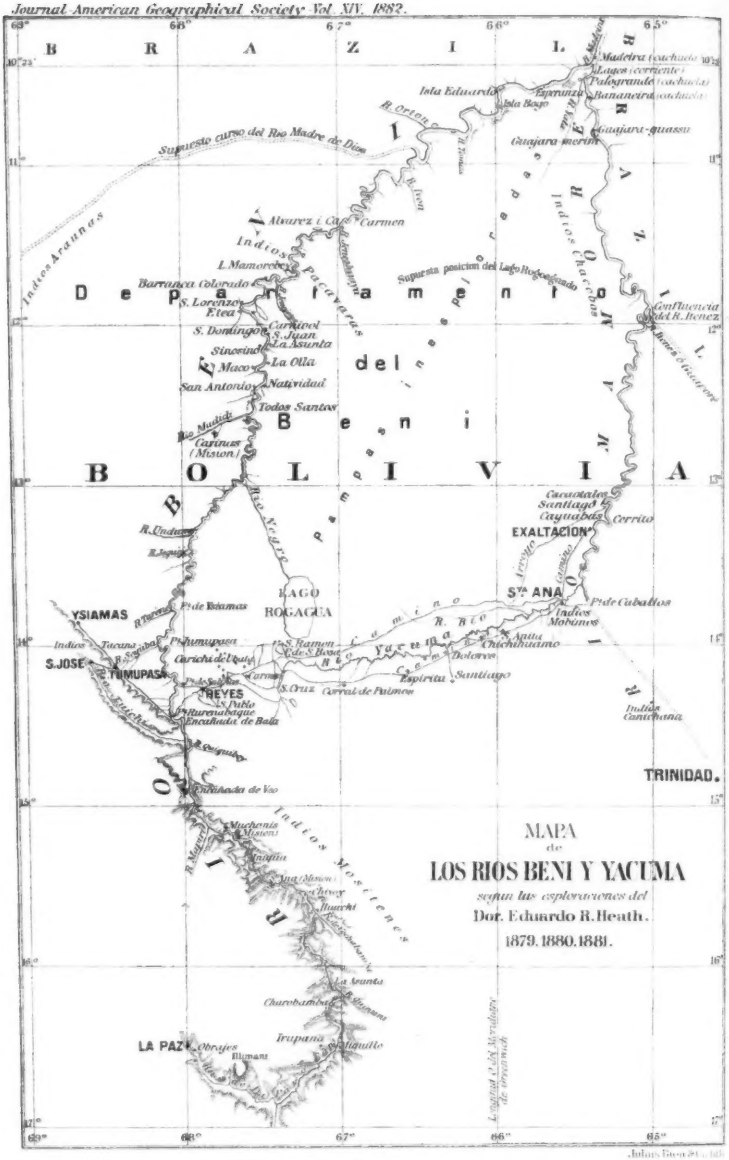
The Topography of the Pyramids and their connection with the Bahr Yusuf, Labyrinth, Moeris and the Sphinx. A summary of an address made during the meeting of the British Association at York, September, 1881. London: Dulau & Co. 1881.

Le Lac Moeris et son emplacement d'après de nouvelles recherches. *La Revue Archéologique.* Juin, 1882. Paris.

Recent Explorations in the Desert, near the Fayoum. Proceedings of the Society of Biblical Archæology. June, 1882. London.

Lake Moeris. A Report of a Conference held at a meeting of the Ascham Society, July 11th, 1882. *The Athenæum,* July 22d, 1882. London.

A Nile Reservoir: The Ancient Moeris Basin. Paper read in the rooms of the American Geographical Society, October 23d, 1882. The New York *Herald,* October 23d, 1882. New York.


B R A Z I L
B O L I V I A
Departamento del Beni
Supuesto curso del Rio Madre de Dios
Supuesta posicion del Lago Rogoaguado
Indios Araonas
Indios Pacavaras
Indios Chacobos
Indios Cavinas
Indios Mosetenes
Indios Canichana
Indios Mobimos
Indios Tacanas
Indios Yuracares
Indios Chimanes
Indios Yuracares
Madeira (cachuela)
Lago (corriente)
Pulogrando (cachuela)
Bananeira (cachuela)
Isla Eduardo
Isla Bago
Esperanza
Guajara merim
Guajara-guassu
Rio Orton
Rio Beni
Rio Madre de Dios
Rio Madidi
Rio Negro
Rio Tuichi
Rio Quiquibey
Rio Mamore
Rio Ichoa
Rio Chapare
Rio Ichilo
Rio Sajta
Rio Grande
Rio Piray
Rio Yapacani
Rio Yacuma
Rio Mamore
Rio Itenez
Alvarez i Cia
Carmen
L. Mamoreco
Barranca Colorado
S. Lorenzo
Etea
S. Domingo
Curichivel
S. Juan
La Asunta
Sinsinio
Maco
La Olla
San Antonio
Natividad
Todos Santos
Carinuas (Mision)
Cachuelas
Santiago
Cayuabas
Cerrito
EXALTACION
Sta ANA
Pde Caballos
R. Undumo
R. Ingavi
LAGO ROGAGUA
Pde Yamas
YSIAMAS
Pumupasca
Carichi de Ucuta
S. Ramon
Pde S. Bonifacio
Yucumo
Dolerve
Chichihuamo
Nuta
S. JOSE
TUMUPASA
Carmen
Espiritu Santiago
REYES
S. Pablo
Barranchigua
Encabada de Bala
S. Cruz
Corral de Palmos
Encabada de Vao
TRINIDAD.
MAPA
de
LOS RIOS BENI Y YACUMA
segun las esploraciones del
Dor. Eduardo R. Heath.
1879. 1880. 1881.
Muchania
Mapiri
Tuquia
Nva Mision
Chuyer
Muarki
La Asunta
Charobamba
Irupana
Yanacachi
LA PAZ
Obrajes
Llimani
Capital del Meridiano de Greenwich
68°
67°
66°
65°
69°
16°
17°

THE EXPLORATION OF THE RIVER BENI,

BY

DOCTOR E. R. HEATH.

Historical Review.

In 1846 the Bolivian Government sent instructions to the Prefect of the Department of Beni, Don Augustin Palacios, to explore the unknown part of the river Beni and the falls of the Mamoré and Madeira rivers. With ample men and means, he fulfilled his mission in part. He ascended the river Beni eighteen miles, when he found the river obstructed by rock, forming a fall.

The same year a Prussian, Bursa by name, undertook the ascent of the river Beni. He had with him ten canoes. He returned, reporting having ascended thirty days, needing ten days to descend.

He "ascended to a large island, near by some hills, the river full of foam." Here he "met the Indians in such numbers that, having fought until all his ammunition was exhausted, he had to return."

Since he reported having met with no falls or rivers, and as all these conditions he described are found twelve miles above its mouth, it is evident that that was the limit of his voyage.

How he should have found so many Indians, and they hostile, in the same year and place where Palacios found only one family of Caripuna Indians, with whom he left his son while he descended the falls of the Madeira and

returned, seems strange. In 1852 Lieut. Gibbon was sent by the U. S. Government, in company with Lieut. Herndon, to obtain information concerning the tributaries of the Amazon.

Gibbon was assigned the southern route, passing through the Department of Beni, and descending the rivers Mamoré and Madeira. He simply passed the mouth of the river Beni.

In 1877 Prof. James Orton, accompanied by Ivon D. Heath, following Gibbon's route in part, arrived to within twenty-four miles of the mouth of the Beni, had his undertaking frustrated by the mutiny of his soldiers and Indian paddlers.

In 1879 the Cura Serabia attempted the descent of the Beni. One of his rafts overturned when he had only descended nine miles, causing him to desist.

In the year 1827 the Jesuit missionaries descended the Beni as far as the Cavinas tribe of Indians.

On a little stream that empties into the river Madidi they established a mission. From there they made expeditions, having in one of them descended as far as the river Jenejoya, to which they gave the name "Biata." There they obtained one of the families of Pacavara Indians, whom they took as converts to Cavinas. In 1869 or 1870, reports coming from Cavinas that the rubber-tree grew in that place, two Bolivians, "Francisco Cardinas and Pablo Salinas" went there. They made rubber shoes, cloth, and specimens of rubber, which they sent to Europe. The quality proving excellent, a few men entered into the business of rubber gathering, but confined their places to that

region about Cavinas. Dr. Heath, on arriving at Reyes, near the river Beni, found the above all the information he could obtain regarding the river he so ardently hoped to descend. Ten months residence at Reyes only made the undertaking appear next to impossible. An opportunity presenting of visiting the rubber camps at Cavinas, he left Reyes on Aug. 3d, 1880, for the river Beni, distant 12 miles. The first league was open prairie, then nine miles of dense forest, with mud six to eighteen inches deep. The carts had been sent early in the morning of the 2d, arriving the evening of the 4th. These carts, returning, carried rubber, but required four days to reach Reyes. There the rubber is sewed up in hides in packages of 150 to 200 lbs. It is then transported in carts to the river Yacuma, fifty-seven miles, then in boats to Santa Ana, and by other boats down the Mamoré and Madeira rivers to San Antonia, Brazil, where the monthly Amazon steamers receive it and deliver it to the rubber houses at Para.

The time required to transport the rubber from the camps at Cavinas to the port of Reyes varies from twenty-five to fifty days. One can realize what dread there must have been of the unknown portion below, to cause such a circuit and loss of time. Reference to the map will assist one in realizing the condition of affairs in August, 1880. On the 6th, the boat being loaded at 10 A. M., the eight Indians dipped their paddles and the voyage commenced. At every bend was a sand-bar, causing much trouble in ascending, the Indians being obliged to tow the boat, wading in the water three to four feet deep.

At 4.17 P. M. the mouth of the small stream Seyuba was

passed, and camp was made soon after on a sand-bar in front. The Seyuba rises in the mountains at Tumupasa, and the Tacana Indians living there follow it to its mouth in their yearly visit to the Beni to fish and collect turtle eggs on the sand-bars. Their indication of the position of Tumupasa with the mouth of the Seyuba gave me my first idea regarding the error of the geographical position of that town.

The day had become overcast, and at 8 P. M. the wind suddenly changed from the northwest to the south, blowing with great violence. At 9 P. M. the rain began to pour. Towards morning it turned to drizzle, with a stiff breeze. The thermometer fell from 94° to 62° Fahr. The 7th of August was passed keeping out of the storm. On the 8th, although it still misted at times and the thermometer stood at 62°, orders were given to advance, and the Indians taking off their only covering, a bark shirt, took their paddles, shivering with cold. At 2.45 P. M. the mouth of the little river Taréne, emptying into the Beni from the west, was passed. Its mouth represents the port for the town of Ysiamas. During the afternoon various tigers were seen on the sand-bars, and when camping at 6 P. M. the ground was found covered with their footprints. August 9th, river and bends wider, with a current of one to two miles per hour. Some of the men took the time while stopping for breakfast to make new shirts. A young Brazil-nut tree of the proper size being found, the bark is stripped off to a height of eight to ten feet. This is taken to the river, placed on a log or stone, and beaten with a stick. When free from outer bark, the fibres are opened and forms a good cloth.

This is then folded in the middle, a space left for the arms, the sides sewed to near the bottom, and a slit cut for the head. When old these shirts are as soft as old linen. During the afternoon two boats, loaded with rubber, were passed. They had occupied thirty-two days in reaching this point.

August 10th. At 7 A. M., the river Euaporera was passed, at 8.56 A. M. the Jequéje, and at 2.20 P. M. the Undumo. These streams, 30 to 50 feet wide at low water, and 8 to 10 feet deep, empty into the Beni from the west.

Made camp at 4.37 P. M. The night being favorable, an observation for latitude was made, giving 13° 12′ 15″ latitude south, the lower part of Reyes being in south latitude 14° 15′ 56″.

August 11th. Many tigers seen to-day. At 4.02 P. M., stopped in the mouth of the river Negro. It was 100 feet wide, 20 feet deep, and no current at its mouth.

This river was partially ascended by a Frenchman, who reported the alligators so viciously friendly that he had to return. There being no good place to camp, the descent was continued till 5.03 P. M. The clouds prevented an observation.

August 12th. While at breakfast, the Indians hastily covered their fires, quickly and noiselessly went to their boat, and immediately crossed to the other side of the river.

Surprised at their evident fear and caution, they answered our inquiry as to the cause by pointing to smoke curling up through the forest near by our camp, and saying the simple but expressive word, "barbaros," their word for savages. We learned afterwards that every year this region

is visited by a savage and warlike tribe of cannibals, who live in the northwest and who kill many of the Cavinas Indians. Current two miles per hour. Camped in south latitude 12° 45′ 27″.

August 13th. Killed three large spider monkeys, called by the natives "Marimouos." A large fire being made, they were thrown into the flames, which singed their hair and blistered the skin, making it easy to clean off. When scraped, they appear like naked white children. An elevated platform of green poles is made over embers and the monkeys placed entire upon them, where they are roasted. The food is rich and preferable to all others as soon as one learns to forget their resemblance to human beings.

Early in the morning we passed the little brook called Santa Clara, the old port for the mission of Cavinas. The next bend below has a high red bank, the first high land since leaving Reyes.

In former years a tribe of Guarayo Indians had a village on this high ground. They are now extinct, or moved to other parts. At 12.22 P. M. we passed the Arroya Vira. About 4 P. M., the river, being very low, exposed some rocks, and made a strong current, needing care to pass. At 4.11, stopped at Santa Rosa, the first place where rubber was collected, now deserted for better places below. At 5.15, passed the mouth of the river Madidi, in latitude south 12° 33′ 13″. This is the first important tributary of the lower Beni, causing a perceptible increase in the quantity of the water in the river. Two days' rowing up the Madidi brings on to the mission.

August 14th. Passed "Todos Santos" and "San An-

tonio," arriving at our destination, "Maco," at 2.08 P. M., in latitude south 12° 17′ 25.5″, distant in right line 110 miles from Reyes, 117 miles from the port of Reyes, 217 miles from the mouth of the Beni. Distant by river from the port of Reyes 234 miles. Time of descent, 58 hours and 30 minutes. I had the good fortune to find the proprietor of Maco ready with boats and men to descend the Beni in search of a new rubber place. Accepting a place in his boat, the voyage was resumed on the 16th. At 1.08 P. M. we stopped to take coffee at Sinosino, and camped for the night at San José, another rubber camp in latitude south 12° 07′ 33″. The bank of Sinosino was nearly 50 feet above the river. The river from Maco begins now to gain direction eastward. Sand-flies, "marnims," and tabanos, black and yellow, make the days intolerable, while the mosquitos by night give no rest.

August 17th. We passed San Juan, Santa Domingo, California-Etea-San Lorenzo, camping at 12.30 A. M. of the 18th at Santa Ana, the last rubber camp. Here we found a family of Pacavara Indians, who were living with Fidal Eudara and helping him collect rubber and make plantations of rice, caru, yuca, bananas, sugar cane, and houses. Both men and women pierce the septum of the nose, through which they thrust feathers from each side, at a distance making them appear as having heavy moustaches. They wear in their ears the eye-teeth of alligators. Their complexion is almost white, and the females, if dressed as civilization requires, would be, for the most part, beauties. Their movements and conversation are rapid, differing from all other Amazon tribes I ever met. Their mode of counting

is by closing the hands, and as each finger is opened saying nata. When the ten fingers are finished they say echasu. Needing more numbers they repeat nata with each toe and again repeat echasu at the close. Thus using fingers and toes, they continue till the number is reached.

August 18th. At 2.20 P. M. we resumed our march, Don Fidel Eudara accompanying us, having two Pacavara Indians as part of his crew. Camped on the sand-bar near the mouth of the Jenejoya.

August 19th. Passed the Jenejoya, a river 200 feet wide and 20 feet deep. About six miles up this river is the village of the Pacavara Indians. About 10 A. M. we passed an arroya (little stream) outlet of a large lake, called by the Indians Mamorebey, from Mamore, a fish, and bey, a lake, the Pira Rucu being found there, and only there, after leaving the falls of San Antonio, Brazil. The banks on the north side at Mamorebey are rocky, and on the south side, the next bend below, the rocks jut out to nearly half the width of the river. Rising almost perpendicular above these rocks is a red clay bank forty feet high. On an island two bends below the clay bank, we saw a number of Capibaras feeding. We succeeded in killing one. More than half the weight of the living animal is water. The meat is unpalatable till dried. This animal is very timid and wild. The greater portion of the 20th was spent in writing up my diary, while the rubber men were roaming through the forest prospecting for rubber trees and a good location for houses.

August 21st. We advanced a little, remaining in our new camp till the 23d. Señ. Vasquez, whose guest I was,

resolved to remain at this point. After much pleading, a boat, with nine Indians, was put at my service. Accompanied by two Bolivians, we renewed our descent. August 24th, at 11.35 A. M., we passed the Jeneshuaya River, of a size equal to the Jenejoya. From this point our Pacavara Indians gave indications of fear to advance, and this fear communicated itself to my companions.

August 25th. After advancing slowly all day, we camped at 5.43 P. M.; they refused to advance further. This was in south latitude 11° 11′ 29″, 47 hours and 16 minutes actual voyage from "Maco." My calculations gave the mouth of the Beni 143 miles distant in a right line. Pleading did no good. On August 26th we began our return.

August 30th. We unexpectedly came upon a large clearing, and there found Señ. Vasquez. He called his new place Concepcion. The rubber trees were large and numerous, there being more than 10,000 trees in a space of five miles square.

September 12th. We again arrived at "Maco."

September 21st. Three of us started to cut our way through the forest on the south bank to the pampa. We began at 6 A. M., each taking the lead in turns, and cutting vines and underbrush till tired. In four hours we reached the open pampa. It took fifteen minutes to return. This will convey a little idea of travel through these Amazonian forests.

September 25th. I ascended the river to San Antonio and there met nineteen Arauna Indians, who lived on the Madre-de-Dios, north and west of San Antonio. These Indians

do not pierce their nose and ears. Small of stature, ugly in features, one could readily believe them to be cannibals. Three years previous Dr. Vacca, owner of San Antonio, had purchased a boy of this tribe, who now speaks readily the Spanish and served as interpreter.

Through him as interpreter we learned they considered the descent of the Beni to its mouth as impossible, their answer to Dr. Vaca being, "How is it that you think of such a thing when we, who are men, cannot?" "How are you men and I am not," asked the Doctor. "Because we see you have but one wife, while the most ('incapas') worthless in our tribe have at least four." They were entirely nude, having left their women at home. In conversation with Dr. Vaca, I learned he had provisioned boats and sent them down the river to select sites for new rubber camps and then descend ten days below my last point. I was not long in determining to join his party. Dr. Vaca proposed to visit his rubber place at "California," where he had a small boat.

On the 27th day of September, with Dr. Vaca and nine Arauna Indians in addition to our native crew, we began the downward voyage. Don Antenor Vasquez sent with me one of his Indians, one who had been my body servant on my last voyage. He volunteered to go with me, even though every one tried to dissuade him.

September 28th, we landed at California. There I found submerged an old boat, fifteen feet long by four feet wide. Bow and stern I could thrust my hand through. Pulling it on land, we caulked it as well as we could with corn husks and plastered mud over them. Hastily collecting a few things necessary, we were ready to start. The Mobima

Indian assigned to go with myself and Indian of Señ. Vasquez was suddenly taken sick, whereon Dr. Vaca ordered another man to take his place. We pushed into the stream one inch only free from water. Our boat leaked so badly we were obliged to bail constantly, and it was very doubtful if we would reach the next camp. At 5.50 P. M. we tied up at the camp of Señ. Limpias. Here we unloaded and with nails, bark and mud repaired our boat. The next day on launching it was found dry and good.

September 29th. We arrived at Santa Ana and were welcomed by Señ. Eudara and the Pacavara Indians. When they comprehended what I proposed doing, the Pacavaras seemed frightened. They had formerly told me (Mrs. Eudara serving as interpreter, she having learned to converse with them) that savage Indians inhabited the lower Beni and advised me to shoot at sight any Indian seen with long hair. Mrs. Eudara was the only person in Bolivia who did not throw cold water on the undertaking. She told my two Indians to go with the Doctor and the Creator would protect them. As we cast off to continue our advance, the Pacavaras men and women stood on the bank and murmured "death, death," and I afterwards learned they put mourning on for a month to counteract the evil effects of having looked upon the dead.

September 30th. Came suddenly upon the camp, at Mamorebey, of the boats sent by Dr. Vaca. They had descended to the river Jeneshuaya, made a clearing, planted plantains and were on their return indignant at the presumption of Dr. Vaca sending them to die. Satisfied that I could not persuade them to continue with me, I

resolved to go ahead with my two Indians. Was then informed that one of those Indians belonged to Dr. Vaca, and I had to resign him. Hunting up my other Indian, Ildifonzo Roca, I found him with a raging fever. I told him how matters stood and asked him if he would return with these men to "Maco." He answered, "No, I am going with you as far as you go." Procuring some provisions, as soon as Ildifonzo was a little over his fever we went to the bank to our boat. It was then that Dr. Vaca's agent consented to let the other Indian go also. As we started, our boat had only three fingers' breadth out of water.

October 1st. At 5 P. M. we reached "Concepcion."

October 2d and 3d, remained at Concepcion, Ildifonzo being very sick. Here I discovered that all but one "matchela" (large knife) had been stolen while at Mamorebey.

October 4th. My Indian being a little better, we resumed our journey. At 10 A. M. his fever returned and we had to tie up. The heat, sand-flies and tabanos and sickness of my best man made the expedition look doubtful, but did not cause one moment's hesitation to proceed.

October 5th. Indian better and resumed our march, I taking the paddle of Ildifonzo and he lying still in the boat. About 4 P. M. met the canoe of one of the rubber gatherers who had gone down to a place near the river Jeneshuaya. I took this opportunity of offering my men their freedom to return. This they refused to do, and we bade good-bye to the last of civilization for many days.

October 6th was a very hot, sultry day. At 1.10 P. M. a

hurricane struck us. Massive trees were wrenched from their homes and whirled many hundred feet distant. It lasted only fifteen minutes, but was grand in its might and effects. The cool air aided us all, and for the first time Ildifonzo took his paddle in earnest.

October 7th. At mid-day we passed the last point reached on our former descent. Various times each day we landed to explore the country and see if there were any indications of hostile Indians. We camped on a sand-bar in mid-river in latitude 11° 04′ 46″2.

October 8th found us again advancing. At 8 A. M. we saw a stream emptying in from the south similar to the Jenejoya, to which I gave the name Ivon, in memory of Ivon D. Heath, the companion of the late Professor James Orton. At 12 M. we found ourselves at the junction of a much larger stream with ours. Crossing to a sand-bar in the middle, we landed near some capibaras wallowing in the edge of the river. They only raised themselves on their forefeet and wondered at us. This great tameness in an animal, generally so wild, dissipated all thoughts of Indians and villages reported to exist at this junction. Triangulation gave the larger stream 2,350 feet wide, and the lesser 735 feet wide. Having met with a large island two bends above, similar in appearance to the junction, we had left the Beni proper before we realized it, and then it was too late to return and measure the depth of the Beni. The Madre de Dios, the larger river, gave forty feet as its shallowest place. This, then, was the great river so often spoken of by the natives. Some five miles below, the river spread out to a mile in width. The current is now three to five miles an

hour. We camped at 4.30 P. M. Alligators abundant and very friendly. Tigers in sight. Lat. 10° 51′ 14″2. Sat up till nearly 2 P. M. to get an observation. Having had our monkey meat taken from our boat nearly every night by the alligators, I took the precaution of putting the meat at the head of my bed and partly under the blankets. Towards morning was awakened by feeling something near me, and then soon after heard a plunge in the river. Springing to my feet I found an alligator had carried off our meat. Occupied with this event, I did not notice a large tiger not twenty feet away, who had just dug up a nest of turtle eggs. Having finished his eggs, he marched into the forest. All animals being so tame led me to hope for a safe passage.

October 9th, at 6.50 A. M., we passed a large stream emptying from the north. To this I gave the name Orton. This river is as large as the Madidi. Sand-flies very bad to-day. At 12.15 P. M. met a porpoise. These porpoises are very common in the Amazon, Madeira, Mamoré and Yacuma rivers. Their absence in the Beni was proof positive of impassible falls. This lonely creature kept us company all day and part of the next. It gave me great hope of success. The mosquitoes, being so thick and voracious, I had to forego an observation. I tried, but they got in my eyes and bit so that blood dropped from my face down on my shirt bosom.

Sunday, October 10th, passed two large islands. Tabanos left us. At 10 A. M. we arrived at a rapid, but passed between the rocks with ease. At 11 A. M. stopped by a line of rocks crossing the river. Landing on the north side of

the main shute, and climbing a high point, I studied the situation. Can we pass? On this side no, unless we draw our boat over land through the forest. With but one knife, this was not to be thought of. Crossing to the south side we found a smooth rock, and over that finally drew our boat to the waters below. With great difficulty we prevented our boat from being dashed in pieces by the turbulent waters below. At 6 P. M. we were loaded, and started to pass through the waves raised by the fall. Our boat nearly filled. As darkness settled down we tied beside the bank, where a ledge of some two feet wide gave sleeping room for my Indians, I passing the night between alternate bailing, and inking over my notes and perfecting my map. The hard usage had made the boat leak very badly, and I had to bail often. This was a night to be remembered; although very tired, after paddling ten hours and working like a servant, yet no time for me to sleep. As soon as we could see we started on.

October 11th. Without breakfast or supper the night previous. About 8 A. M. I recognized the hills that correspond to Palo Grande fall on the river Mamoré, and, turning to my Indians, I informed them of our position and positive success. "Then," said Ildifonzo, "there is hope of our not losing our lives." I answered there was. "Then let us call the fall Esperanza (hope), since passing that we have hopes of living." Poor man, he had until that moment lived under the impression that his days were few and numbered. This is the point where Bursa, in 1846, reported finding so many savages. At 10 A. M. we landed at the mouth of the Beni, at a banana patch planted by us

August 10th, 1879, while ascending into Bolivia. Our success had been complete. What should we do now? To return by the Beni would be hazardous in case of sickness or accident, therefore we decided to ascend the Mamoré 325 miles, to Exaltacion. By this time our food had been reduced to what game we could procure—dried plantains and yuca (now wormy), and "harina" of yuca. To prevent loss of my exploration in case of accident, I wrote out a condensed account, directed to the owner of the plantation, which was deposited in a safe place and notice of it cut in a tree. While stopping for dinner I again cut in a tree notice of what had been done. That night we slept at the foot of the rapid "Larges."

October 12th was passed in the same place owing to the sickness of one of my men.

October 13th. We passed "Larges" and "Palo Grande" rapids. At the latter we had our boat submerged, losing all our bananas, rubber clothing and our last knife. Our food, which was sewed up in a hide, and our paddles, were carried to the centre of an immense whirlpool and were saved by swimming to them and pushing them out. One of our paddles was lost. Finding a stick that had once been blocked out to make a paddle, I partially reduced it to the proper size by aid of fire and a stone.

October 15th. We passed the Falls of Bananeira, which corresponds to Esperanza on the Beni.

October 16th. We passed the rapids of "Guajara-Guassu" and "Guajara-Merim."

October 17th. Being a windy and stormy day, we had to tie up most of the time, the waves being too high for our

boat. That night, about 10 P. M., I was obliged to call my Indians, who were sleeping on a bank near by. We had barely time to take our things out, before the boat filled and sunk.

October 18th. After an hour's hard work we succeeded in causing our boat to float. It leaked badly, and until November 5th, when we arrived at the port of San Martin, the lower port for Exaltacion, my feet were not dry, and it was with great care we kept afloat. To-day we saw one tabano, showing we had approached their region, latitude south 11° 09′ 45″. Sand-flies very scarce. The parrots and macaws have more musical voices.

October 20th. Being on the Brazilian side of the Mamoré river, we heard some one calling. With our field glass we saw a naked Chacobo Indian standing on the sandy shore on the opposite side. Seeing we made no change in our course he stopped calling, and then some twenty armed men sprang from the shelter of the trees, where they had been lying in ambush. This was the only time we saw Indians except among civilized people. Our arrival at Exaltacion caused great excitement. The authorities could not realize it as possible, and they obliged my two Indians to eat and drink before them, even feeling them and pricking them to see if they were human. While they were in this excited state a Bolivian, who had just been to Cavinas, came bringing the news that I had been gone a month and all supposed us lost. As he was the man in whose boat I came from Brazil, he took interest in my fate. Great was his surprise to see me face to face.

November 10th. We resumed our ascent of the Mamoré.

At 10 P. M., November 11th, arrived in search of us a canoe sent by the Sub-Prefect. We had just retired. Immediately breaking camp we resumed our voyage, and as the men with their powerful stroke caused our boat to glide rapidly through the water, myself a passenger, it dawned upon me for the first time that my work was finished.

November 12th, at 7 P. M., we arrived at Santa Ana, on the river Yacuma. The rainy season having begun, the pampas were full of water. At last, procuring carts, my boat being placed on one, we started westward. For two days only we saw dry land, that being found only where the residences of the owners of cattle estates were located. Finding water increasing in depth, I left my horse and took my place in a cart with a hide doubled so as to form the sides and bottom of a box. When drivers, oxen and cart were swimming my hide floated like a boat, keeping me dry.

December 11th, at 5 P. M., we arrived at Reyes. Bells were rung, houses decorated, a holiday proclaimed, school children met me three miles out and escorted me to Reyes. Mass was said, and all seemed to consider my work a public benefit.

Results of the Exploration.

Men became crazed over the rubber prospect, and many sold their cattle and lands to go into the business. Before the exploration 185 men were engaged in collecting rubber on the river Beni, gathering 104,000 lbs. in 1880. Within four months after the exploration, that number had changed to 644, and most likely by this time there are from one to two thousand employed gathering crude rubber. What, then, must the yield be now?

They then only gathered eight months each year, needing the remainder to deliver their rubber at the port of Reyes and plant their rice, yuca, bananas, corn, onions, etc., and collect palm nuts. Now they only lose two months in the working of their plantation, having ten months to use for rubber. Formerly coffee, cocoa and Brazil-nuts were only collected for home use, now they can be exported in large quantities. Vanilla beans were left to rot on the vines. Ipecac, capaiba, cinnamon, coto bark, matico, were never collected. Hides of deer and tigers and sloth skins were occasionally shipped. This is the home of "cardinal," "matico," "tordo curichi," "tordo" birds, wild turkeys, mutun, or courasan turkey, jacamin, ostrich, the ant bear, armadilla, wild hog, and various classes of monkeys.

Meteorology.

One of the results of the exploration, especially valuable to science, is the solution of the difficulty of barometric and boiling-point thermermetric measurements for altitude. Prof. Agassiz says: "The barometer cannot be depended upon to determine elevations on the Amazon."

To corroborate such testimony we have Manaos, on the river Negro, given by Wallace as 253 feet below the sea level; Azevedo and Pinto, 92 feet above; Jas. Orton, 199 feet; Castelnau, 293; Spix and Martins, 565; and Herndon, 1475. Gibbons' boiling-point was the same for all points on the Madeira river below the rapids of San Antonio, and at Manaos, showing a uniform pressure of the atmosphere for a distance of 670 miles and over, and from October 3d to 25th, *i.e.*, twenty-two days. San Antonio

is on the river Madeira, 560 miles above its mouth, and is in south latitude 8° 48′ 14″, longitude west of Greenwich 63° 55′ 05″ (Selfridge), compass var. in January, 1879, 5° 56′ (Heath). The months of February and May are shown, since they were the months in which the barometer was the lowest and highest, February marking 28.9 inches, and May 29.5 inches. From February to June, inclusive, the mean barometric reading was increasing from 28.9 to 29, 29.1, 29.2, 29.3, June being rather over three-tenths than under.

Before May the atmospheric pressure remained the same before, during and after the passage of a shower, although accompanied by a sharp blow, a dead calm both preceding and following the shower; but no sooner did the May breeze spring up than the barometer showed the change in atmospheric pressure, as it increased or decreased in force. As a rule the nights are so calm that observations can be made with the artificial horizon uncovered without the least particle of motion of the mercury. The country is nearly level and covered with a dense tropical forest which covers it to the depth of 200 feet and over. Light and air seldom penetrate this covering, so that motions of air above the tree tops would be little felt on the ground beneath. The river-bed is generally from 20 to 50 feet still lower, and it is from the river-level that most calculations of elevations are made. But at this point the ground is hilly and clearer, so that currents of air can reach all parts, although in eddies. The river rises and falls from 45 to 50 feet, although over a mile in width. It reached its highest point this year March 13th. The height of the water in the river, in February and May reports, is calculated from station zero of the Madeira and

SAN ANTONIO, RIVER MADEIRA, BRAZIL, S. A., FEBRUARY, 1879.

Date.	Height of Water in the River.	Rainfall.	Thermometer.		Weather.				7 A. M.		12 M.		6 P. M.		9 P. M.	
			Max.	Min.	7	12	6	9	Merc. Bar.	Ther.	Merc. Bar.	Ther	Merc. Bar.	Ther.	Merc.Bar.	Ther.
1	.....	.180	80	72	R	R	C	C	29.162	76	29 131	82	29.120	78	29.122	78
2	.....	.080	90	72	C	C	C	R	29.020	76½	29.114	87	29.000	83	29.100	79
3	170.360	.070	91	72	C	C	C	C	29.191	76	29.121	91	28.962	88½	29.084	79½
4	.....	....	92	72	C	C	C	C	29.172	77	29.062	91	28.994	88	29.082	83
5	.....	.450	94	74	O	C	C	C	29.133	78	29.023	88	28.920	87	29.002	82
6	169.365	.340	90	73	C	P	C	C	29 131	77	29.040	89	28.991	82	29.024	80
7	.....	.050	90	72	C	C	C	C	29.150	77	29.024	91	29.023	82	29 084	78
8	.....	.645	84	73	C	P R	R	C	29.131	78	29.071	83	29.082	77	29.113	77
9	.....	.865	88	72	O	C P	C P	R	29.154	76	29.062	87	29.004	86	29 101	79
10	172.725	.040	88	72	R	C	C P	C	29.222	75	29.131	87	29.070	80	29 152	78
11	.....	.010	86	74	C P	O	C	C	29.184	76	29.141	84	29.001	89	29.131	80
12	.....	.410	88	74	C	C	C	C	29.141	77	29.112	89	28.964	87	29.092	81
13	172.990	.230	88	74	C	O	R	C	29.142	76	29.120	86	29.003	84	29.103	79
14	.....	.460	93	74	C F	C	C	C P	29 152	78	29.121	86	28.983	88	29.070	83
15	.....	.030	88	74	R	R	C	O	29.200	76	29.200	78	29.071	80	29.113	77
16	.....	.070	85	70	O	C	C	C	29.164	75	29.022	89	29.071	80	29.044	80
17	178.465	.380	86	71	F	R	C	C	29.141	77	29.120	84	28.993	86	29.042	81
18	.....	....	88	73	C	R	B	B	29 174	77	29.161	86	28.992	86	29.102	79
19	.....	.625	91	74	C	C	O	O	29.163	77	29.131	87	29.011	88	29.074	83
20	179.209	.880	92	72	O	O	O	O	29.162	78	29.141	85	29.071	78	29 140	77
21	.....	....	86	72	O	B	O	R	29.200	75	29.162	82	29 056	83	29.113	79
22	.....	2.100	85	70	O	O	O	O	29.212	76	29.192	84	29.140	77	29.152	76
23	.....	.190	88	72	O	C	B	B	29 250	77	29.100	89	29.094	85	29.140	80
24	180.314	....	84	72	C	C	O P	O	29 190	74	29.122	81	29.080	83	29.083	77
25	.....	....	88	72	O	R	O	O	29.154	75	29.103	88	28.941	86	29.092	81
26	.....	....	92	74	C	R	O	O	29.090	75	29.074	90	29.012	85	29.064	82
27	.....	1.010	86	74	C	C	R	R	29.090	78	29.103	79	28.993	84	29 050	80
28	180.404	1.130	88	74	C	C	R	R	29 084	77	29.052	88	29.043	82	29 101	78

METEOROLOGICAL OBSERVATIONS MADE AT SAN ANTONIO (RIVER MADEIRA), BRAZIL, S. A., FOR MAY, 1879,
BY E. R. HEATH, A. M., M. D.

Date.	Height of Water in the River.	Rainfall.	Thermom'r.		Wind. Direction.				Wind. Force.				Weather.				Aneroid in Feet.				7 A. M.		12 M.		6 P. M.		9 P. M.	
			Max.	Min.	7	12	6	9	7	12	6	9	7	12	6	9	7	12	6	9	Mer. Bar.	Th.	Mer. Bar.	Th.	Mer. Bar.	Th.	Mer. Bar.	Th.
1	175.724	...	88	71	O	SSE	O	O	0	5	0	0	O	C	BC	B	1100	1150	1095	1110	29.273	75	29.231	86	29.174	83	29.240	77
2	.. ...	..	91	70	S	SE	O	O	0	2	4	0	BC	C	C	C	1110	1110	1100	1150	29.263	73	29 251	85	29 172	85	29.214	78
3	.....	...	94	72	O	S	O	O	0	0	2	0	BC	BC	C	C	1130	1120	1210	1150	29.260	72	29.241	86	29.173	84	29.204	78
4	.....	.010	91	73	O	E	O	O	0	1	0	0	C	C	C	C	1150	1165	1250	1200	29.253	72	29.212	88	29.134	83	29.163	79
5	172.979	...	91	71	O	NE	O	O	0	1	0	0	O	C	C	CB	1175	1175	1250	1200	29.220	77	29.210	87	29.133	83	29.170	77
6	.....	...	91	73	O	E	SE	SE	0	3	3	1	B	C	P	C	1175	1175	1250	1125	29.211	73	19.252	89	29.140	85	29.224	78
7	.....	296	91	73	O	S	O	E	0	3	0	1	CO	C	O	P	1150	1200	1225	1150	29.204	76	29 181	91	29.132	82	29.180	79
8	172.349	...	89	69	O	SE	S	O	0	4	1	0	O	C	BC	BC	1150	1125	1110	1175	29.252	75	29.221	87	29.164	83	29.210	78
9	.....	...	90	67	O	SE	SE	O	0	4	1	0	B	B	B	B	1110	1075	1150	1100	29.280	72	29 281	86	29.201	82	29.253	77
10	.....	...	91	71	O	SW	SW	O	0	2	1	0	B	BC	B	B	1100	1090	1175	1150	29.302	68	29 291	86	29.203	82	29.241	76
11	.....	.358	91	71	O	N	O	O	0	2	0	0	OC	P	O	CB	1110	1110	1170	1110	29.282	74	28.250	85	29.203	79	29.253	78
12	165.479	.189	91	73	O	N	O	O	0	2	0	0	F	C	P	O	1100	1140	1150	1100	29.290	75	29.232	90	29.210	84	29.261	79
13	.....	...	88	68	O	E	O	O	0	2	0	0	O	P	B	B	1090	1075	1150	1110	29.284	75	29 300	87	29.254	83	29.230	78
14	.....	...	90	66	O	E	E	O	0	2	1	0	B	BC	B	B	1075	1100	1150	1110	29 330	70	29.274	88	29.244	82	29 251	75
15	170.414	...	85	69	O	E	E	O	0	3	1	0	P	B	B	B	1090	1090	1190	1150	29.322	67	29.270	88	29.191	84	29.240	74
16	.....	...	85	72	O	E	E	S	0	1	1	1	BC	O	BC	CR	1075	1050	1150	1075	29.311	72	29.322	87	29 240	83	29.260	78
17	.....	.064	90	70	O	W	O	O	0	2	0	0	B	P	C	BC	1100	1090	1125	1095	29.291	74	29.292	88	29.244	79	29.293	74
18	.....	...	86	72	O	E	E	E	0	6	1	1	C	P	O	C	1090	1100	1175	1110	29.301	73	29.274	86	29.191	80	29.233	75
19	167.439	.006	88	72	O	W	W	O	0	1	1	0	O	C	C	O	1100	1100	1175	1120	29.290	74	29.264	88	29.200	80	29.250	78
20	.....	...	91	72	E	W	W	O	1	3	1	0	P	C	C	B	1120	1110	1220	1150	29.260	75	29.251	89	29.160	83	29.223	79
21	.....	.050	90	71	O	W	O	O	0	2	0	0	C	P	C	BC	1150	1175	1205	1150	29.262	75	29.200	88	29.164	78	29.222	75
22	164.889	.002	90	72	E	E	O	O	1	3	0	0	F	B	B	B	1175	1190	1270	1225	29.240	73	29.220	87	29.121	83	29.161	78
23	.....	.065	87	72	O	W	W	O	0	3	1	0	C	P	C	C	1160	1200	1250	1200	29.222	75	29.184	90	29.140	82	29 174	78
24	.....	...	89	70	O	W	O	O	0	1	0	0	F	O	O	O	1150	1150	1250	1150	29.260	75	29.230	86	29.133	82	29.204	79
25	.. ...	...	80	72	E	E	E	E	3	5	2	1	O	C	O	O	1120	1110	1200	1110	29.263	72	29 263	84	29.184	79	29 231	76
26	162.559	...	84	59	O	E	E	E	0	4	3	8	C	C	C	O	1100	1075	1020	1000	29.312	75	29.314	82	29.293	76	29.384	71
27	.....	...	82	60	E	E	E	E	1	3	1	1	C	B	C	O	950	975	1000	950	29.505	62	29.451	76	29.281	76	29.500	72
28	.....	...	82	60	E	E	E	E	1	4	1	1	B	B	B	B	990	1000	1050	1050	29.463	67	29.462	79	29.320	75	29.374	68
29	160.935	...	86	62	E	E	E	E	1	1	1	1	B	B	B	B	1090	1125	1125	1110	29.432	60	29.290	82	29.270	73	29.320	68
30	.....	...	88	62	E	E	E	E	1	1	1	1	B	B	B	B	1025	1035	1075	1050	29.431	60	29.360	83	29.313	77	29.343	72
31	.....	...	83	63	E	SE	E	E	1	3	1	1	B	B	B	C	975	990	1050	1025	29.471	60	29.410	80	29 353	77	29.384	73

Mamoré Railroad, assuming it to be 200 feet above sea-level. From 8 A. M. to 4 P. M. the thermometer generally ranges from 86° to 94°, and on days in which the air is a perfect calm the heat is very oppressive, prostrating one's energy, and planting seeds of biliousness, bilious remitting fevers, agues and jaundice. One peculiar effect is to make the nervous system excessively acute, so that every one passes the night as if under the effects of a strong cup of tea or coffee, making the bladder very irritable, inflaming the kidneys and prostate gland, irritating the stomach so that many die from vomiting. The mortality on the river from bilious remitting fevers and pleuro-pneumonia has been heavy, except at San Antonio. Cramps in the calves of the legs, paralysis, neuralgia and rheumatism and ring-worms are universal. Vampire bats and mosquitoes by night, and sand-flies, ants, wasps, sweat-bees and a minute red mite are the pests to man presented by the climate and vegetation, while mould destroys everything during the rainy season.

The months of January and June, 1880, at Reyes, Bolivia, are also shown for the same reason as February and May, at San Antonio. Besides, we furnish in tabular form a comparative monthly mean for San Antonio and Reyes. The height of Reyes from a mean of twelve consecutive months is 760.8827 feet. June gives 683 feet and January 948 feet. By careful comparison of these reports it will be readily seen that not only is a year's record necessary, but also a 24-hour record to establish a mean whereby the altitude may be computed, and when this is carefully done the barometer proves useful as a leveler, even on the Amazon.

REYES. JANUARY, 1880. BOLIVIA.

Jan. 1880.	Rainfall.	Wind. Direction.				Force.				Weather.				Therm'r.		Aneroid Bar.				6 A.M.			12 M.			6 P.M.			9 P.M.		
Date		6	12	6	9	6	12	6	9	6	12	6	9	Max.	Min.	6 A.M.	12 M.	6 P.M.	9 P.M.	Mer.	Bar.	Th.	Mer.	Bar.	Th.	Mer.	Bar.	Th.	Mer	Bar.	Th.
1	..	O	NW	N	O	0	5	1	0	B	C	B	B	90	76	1600	1600	1690	1620	29.074	73		29.092	87		29.020	83		29.040	80	
2	..	O	NW	O	O	0	2	0	0	O	C	C	O	94	77	1540	1560	1690	1610	.146	76		.126	87		.012	87		068	83	
3	..	O	NW	N	O	0	3	1	0	B	B	B	B	94	78	1580	1570	1710	1650	.112	77		.104	89		28.998	89		.032	83	
4	..	O	NW	O	O	0	4	0	0	B	B	B	B	94	78	1600	1630	1780	1710	.182	80		.070	91		.912	88		28.938	82	
5	..	O	W	O	O	0	5	0	0	O	B	B	B	93	79	1690	1700	1810	1690	28.994	78		28.996	89		.884	88		29.006	82	
6	1.720	E	SW	SE	SE	1	1	1	1	O	R	B	CB	80	73	1600	1495	1640	1550	29.080	79		29.168	78		29.010	78		.120	75	
7	..	S	S	O	O	1	2	0	0	O	C	B	B	94	75	1550	1580	1710	1700	.110	73		.128	84		28.874	83		28.964	82	
8	..	O	NW	O	O	0	3	0	0	B	B	B	B	94	87	1640	1690	1810	1740	.022	75		.054	87		.874	88		.944	82	
9	..	O	N	O	O	0	1	0	0	O	O	O	BC	90	77	1690	1650	1780	1700	28.984	87		.010	86		.928	85		.978	82	
10	.555	NE	SW	SW	SW	1	1	1	1	O	O	O	O	80	74	1650	1640	1720	1680	29.016	77		.040	76		.954	78		.992	76	
11	.010	O	O	O	O	0	0	0	0	O	B	B	C	90	77	1620	1680	1710	1690	.036	74		.044	86		.940	85		.982	82	
12	.593	W	SW	NE	O	2	1	1	0	R	O	O	O	88	77	1640	1610	1710	1650	28.998	77		.060	83		.996	82		29.016	78	
13	.019	O	SW	W	O	0	1	1	0	O	C	C	BC	86	77	1650	1640	1750	1705	29 004	77		.024	84		.932	81		28.974	79	
14	..	SE	NW	O	O	1	4	0	0	R	C	O	O	88	76	1690	1690	1770	1710	28.978	77		.008	86		.910	84		.956	81	
15	..	O	N	N	NW	0	3	2	2	C	O	C	O	87	77	1710	1715	1810	1720	.964	76		28.972	86		.884	84		.928	79	
16	..	NW	NW	NW	NW	1	7	2	2	O	C	C	C	88	77	1750	1710	1760	1710	.920	77		.950	86		.982	79		.950	79	
17	..	N	NW	N	N	1	7	3	1	O	C	O	O	90	77	1710	1720	1780	1710	.940	77		.956	87		.920	83		.964	79	
18	..	O	N	NW	O	0	1	1	0	O	P	O	C	83	76	1700	1680	1705	1650	.976	77		29.022	82		.974	78		29.040	78	
19	.360	N	N	O	O	1	2	0	0	O	R	O	O	81	76	1690	1610	1700	1610	.994	76		.068	81		29.000	80		.054	77	
20	1.000	NW	SE	O	O	2	4	0	0	O	R	O	O	76	72	1610	1540	1570	1580	29.048	76		.116	72		.100	72		.088	74	
21	..	SW	NW	O	O	1	1	0	0	O	B	O	C	84	74	1580	1540	1620	1580	.098	72		.130	82		.040	80		100	79	
22	..	O	NW	NW	O	0	1	2	0	B	BC	C	C	92	77	1580	1520	1680	1560	.058	74		.132	85		.030	82		.096	79	
23	.558	SE	NE	NE	O	1	1	1	0	O	R	C	O	80	73	1550	1510	1620	1610	.122	77		.158	75		.044	78		.052	74	
24	..	W	W	O	O	1	3	0	0	F	B	B	B	90	77	1600	1610	1750	1700	.064	73		.050	86		28.928	86		28.960	80	
25	..	NW	NW	O	O	1	3	0	0	B	B	B	BC	94	79	1700	1650	1780	1670	28.972	77		.000	88		.900	86		.970	80	
26	.610	O	W	O	O	0	2	0	0	O	C	C	B	85	76	1620	1620	1710	1620	29.034	79		.040	82		.954	80		29.020	78	
27	.320	O	N	O	N	0	3	0	1	O	C	C	B	86	77	1630	1700	1750	1640	.034	76		28.926	83		.924	83		.018	80	
28	2.400	N	W	O	O	2	1	0	0	R	R	O	O	75	75	1630	1610	1650	1600	.020	77		29.002	75		29.014	75		.040	75	
29	.020	SW	O	N	N	1	0	2	2	O	O	O	O	86	75	1620	1680	1680	1620	.036	75		28.998	84		28.988	79		.040	78	
30	.880	O	SW	O	O	0	2	0	0	O	R	C	C	83	76	1590	1580	1620	1550	.066	75		29.104	80		29 030	82		.110	79	
31	.200	O	N	N	O	0	2	1	0	R	O	C	C	84	77	1540	1610	1680	1600	.114	76		.100	79		.020	81		.056	78	

REYES. JUNE 1, 1880. BOLIVIA.

REYES. JUNE 1, 1880. BOLIVIA.

June 1880. Date.	Rain-fall.	Wind. Direction. 6	12	6	9	Force. 6	12	6	9	Weather. 6	12	6	9	Ther. Max.	Min.	Aneroid Barometer. 6 A.M.	12 M.	6 P.M.	9 P.M.	6 A.M. Mer. B.	Th.	12 M. Mer. B.	Th.	6 P.M. Mer. B.	Th.	9 P.M. Mer. B.	Th
1	1.205	S	S	S	S	1	3	1	1	N	R	O	O	73	73	1450	1370	1410	1360	29.186	73	29.286	69	29.226	69	29.280	68
2	...	O	S	O	O	0	2	0	0	O	C	O	O	74	72	1390	1350	1450	1410	.254	68	.312	73	.212	74	.248	74
3	..	O	O	O	O	0	0	0	0	BC	BC	BC	O	78	71	1390	1430	1450	1420	.286	72	.234	79	.210	78	.240	75
4	.200	O	NW	O	O	0	2	0	0	C	C	C	B	83	71	1420	1430	1480	1460	.232	71	.226	82	.172	78	.190	76
5	.615	O	NW	O	NW	0	2	0	2	C	C	O	O	85	73	1450	1440	1480	1420	.202	71	.230	82	.184	79	.238	76
6	.008	S	O	O	O	1	0	0	0	R	C	C	O	79	72	1400	1395	1460	1420	.194	73	.272	77	.200	79	.226	76
7	...	O	NW	O	O	0	1	0	0	O	O	C	BC	86	74	1420	1420	1500	1460	.228	72	.234	81	.178	81	.200	78
8	.005	O	NW	O	O	0	2	0	0	B	C	O	O	84	75	1440	1405	1450	1450	.208	74	.268	82	.200	78	.216	76
9	.100	O	O	O	O	0	0	0	0	O	O	O	C	82	71	1410	1410	1450	1440	.260	75	.254	78	.200	78	.214	76
10	...	O	NW	O	O	0	1	0	0	F	O	O	B	82	78	1450	1460	1490	1440	.200	71	.190	81	.180	79	.206	74
11	...	O	N	W	O	0	2	1	0	F	C	C	C	81	72	1430	1480	1500	1490	200	68	.200	81	.162	79	.176	76
12	...	O	NW	NW	O	0	4	1	0	C	P	O	C	82	73	1460	1510	1510	1470	.164	72	.156	72	.144	79	.184	77
13	005	N	NW	O	NW	1	2	0	1	P	C	C	B	88	73	1450	1500	1510	1490	.192	73	.168	86	.148	82	.166	77
14	...	NW	NW	O	O	2	5	0	0	B	C	B	B	86	73	1490	1500	1560	1620	.174	73	.168	84	.118	83	.134	77
15	...	O	N	SE	O	0	1	4	0	C	C	O	O	84	62	1470	1420	1310	1230	.178	73	.242	81	.354	63	.406	65
16	...	O	SE	O	O	0	3	0	0	C	B	B	B	74	56	1290	1350	1400	1390	.362	63	.290	74	.252	72	.260	65
17	..	O	NW	NW	O	0	1	1	0	B	B	B	B	79	62	1400	1410	1450	1410	.260	58	.240	75	.204	76	.250	69
18	..	O	E	O	O	0	1	0	0	B	B	B	B	84	65	1350	1350	1380	1350	.234	62	.316	78	.268	81	.294	74
19	...	O	SE	O	O	0	1	0	0	B	B	B	B	83	67	1330	1350	1410	1395	.294	65	.300	79	.252	80	.266	74
20	...	O	NW	O	O	0	2	0	0	B	B	C	B	84	67	1405	1400	1480	1450	.240	67	.268	80	.196	83	.198	76
21	...	O	N	O	O	0	3	0	0	F	B	B	B	84	67	1450	1410	1490	1450	298	67	.252	82	.180	80	.208	74
22	...	O	N	O	O	0	3	0	0	F	C	B	B	85	68	1420	1420	1505	1460	222	67	.250	83	.162	82	.190	76
23	...	O	NW	O	O	0	3	0	0	B	C	B	B	82	67	1450	1410	1520	1495	.218	68	.264	72	140	82	.184	72
24	...	O	NW	O	O	0	4	0	0	B	C	B	B	86	72	1480	1500	1560	1530	.220	67	.178	84	.106	81	.130	76
25	...	O	NW	O	O	0	5	0	0	C	C	C	C	88	74	1480	1500	1550	1500	.176	72	.188	85	.118	83	.162	76
26	...	O	NW	O	O	0	3	0	0	C	C	B	B	85	75	1490	1400	1520	1510	.180	74	.180	85	.150	82	.150	78
27	.250	N	O	O	O	3	0	0	0	RTS	O	O	C	81	72	1450	1510	1500	1480	.174	75	.150	81	.154	78	.168	76
28	1.500	O	SE	SE	SE	0	3	1	2	F	R	O	O	72	61	1420	1305	1200	1030	.238	72	.338	67	332	67	.384	67
29	...	S	SE	O	SE	2	3	0	2	O	O	O	O	65	60	1160	1090	1230	1180	.476	61	.472	65	.402	65	.472	63
30	...	S	S	O	S	2	3	0	1	C	C	B	B	67	54	1160	1200	1280	1250	.480	60	.450	67	.402	66	.392	62
	3.888																										

MONTH.	YEAR.	RAINFALL.		FAHRENHEIT THERMOMETER.				PLACE.
		Quantity.	No. Days	High't Max.	Low't Min.	Mean of Maximum.	Mean of Minimum.	
January ..	1879	15.000	23	97°	70°	87.996°	72.666°	* San Antonio
"	1880	9.231	14	94	72	87.$\frac{9}{31}$	77.$\frac{27}{31}$	Reyes
February .	1879	10.245	22	94	70	88.$\frac{5}{28}$	72.571	San Antonio
"	1880	5.576	9	94	69	87.000	72.100	Reyes
March....	1879	16.412	24	94	70	87.$\frac{28}{31}$	71.$\frac{28}{31}$	San Antonio
"	1880	6.145	9	92	70	84.$\frac{12}{31}$	76.$\frac{16}{31}$	Reyes
April.....	1879	11 339	21	94	68	88.440	72.100	San Antonio
"	1880	.765	2	86	65	79.$\frac{18}{29}$	72.$\frac{11}{29}$	Reyes
May.....	1878	3.800	11	97	58	86.600	69.600	San Antonio
"	1879	1.040	9	94	59	88.$\frac{5}{31}$	68.$\frac{30}{31}$	"
"	1880	5.145	4	88	64	81.$\frac{1}{2}$	71.$\frac{1}{2}$	Reyes
June	1878	.436	6	97	65	87.500	67.$\frac{1}{5}$	San Antonio
"	1879	2.315	5	93	62	90.$\frac{1}{30}$	69.$\frac{7}{30}$	"
"	1880	3.888	9	88	54	80.$\frac{28}{31}$	69.$\frac{2}{30}$	Reyes
July.....	1878	.010	1	96	57	91.$\frac{1}{6}$	66.$\frac{5}{6}$	San Antonio*
" to 21st.	1879	.000	0	93	60	91.500	64.$\frac{17}{26}$	"
* " 22nd to 31st Inc.	1879	.000	0	94	65	90.000	68.$\frac{3}{9}$	Cachuelas
"	1880	.000	0	90	61	86.$\frac{7}{31}$	70.$\frac{18}{31}$	Reyes
August..	1878	.535	2	98	59	92.$\frac{4}{31}$	68.500	San Antonio
† "	1879	1.002	2	98	52	90.$\frac{16}{31}$	66.$\frac{21}{31}$	Cachuelas
"	1880	1.730	3	..	58	....	....	Reyes
September	1878	1.395	5	101	60	90.$\frac{1}{3}$	68.500	San Antonio
‡ "	1879	4 100	5	96	55	87.$\frac{7}{13}$	69.$\frac{2}{13}$	R. Mamore and Sta. Ana to Reyes.
"	1880	.905	4	..	..	....	....	Reyes
October ..	1878	8.265	16	99	67	90.$\frac{1}{31}$	69.$\frac{26}{31}$	San Antonio
"	1879	7.654	11	95	65	86.$\frac{12}{31}$	71.$\frac{25}{31}$	Reyes
"	1880	2 140	5	..	..	....	....	"
November	1878	9 145	13	94	68	89.$\frac{1}{3}$	67.$\frac{4}{5}$	San Antonio
"	1879	7.275	9	94	68	88.$\frac{29}{30}$	74.$\frac{28}{30}$	Reyes
"	1880	6.530	12	..	..	....	....	"
December.	1878	11.301	21	94	66	88.$\frac{23}{30}$	72.$\frac{4}{15}$	San Antonio
"	1879	10.769	13	94	72	86.$\frac{15}{31}$	75.$\frac{5}{31}$	Reyes
"	1880	1.280	3	..	..	....	....	

Ascent of the Beni and La Pas Rivers.

April 26th, 1881, I left Reyes, accompanied by Mr. Fetterman and his Bolivian wife. We arrived at Rurenabaque, the upper part of Reyes, on the river Beni that night. This port is 24 miles from Reyes by the road, the last 20 miles being through dense forests. Although the main traveled road from

* San Antonio to Girao. † Girao to Itenez (Rio). ‡ R. Itenez to Exaltacion, Sta. Ana and Reyes.

MONTH.	YEAR.	BAROMETERS.		THERMOMETER FAHRENHEIT ATTACHED TO THE MERCURIAL BAROMETER.	LOCALITY.
		Aneroid.	Mercurial.		
January....	1880	1662.7415'	28.9301''	80.2092°	Reyes
February...	1879	....	29.0820	81.2678	San Antonio
"	1880	1592.7145	29.0777	78 2077	Reyes
March	1879	....	29.1733	80.6290	San Antonio
"	1880	1538.1442	29.1147	79.7820	Reyes
April	1879	....	29.2028	80.3333	San Antonio
"	1880	1455.0516	29.2404	76.3244	Reyes
May	1879	1122.7419	29.2603	78.6370	San Antonio
"	1880	1512.6875	29.1916	74.4250	Reyes
June.....	1879	1098.9582	29.3089	79.2000	San Antonio
"	1880	1419.5416	29.2254	74 4916	Reyes
July... ...	1879	1084.3600	29.4671	77.5000	San Antonio
" 21st to 31st	1879	1152.8124	29.3707	77.6041	San Antonio to Girao
"	1880	1468.7499	29.1957	77.3548	Reyes
August	1879	1211.3325	29.4090	76.7500	Girao to R. Itenez
* "	1880	1409.5739	29.1320	78 0282	Reyes
September..	1879	1278.7500	29.3510	83.2857	R. Itenez, Sta. Ana to Reyes
† "	1880	1374.9333	29.2260	75.5930	Reyes
October....	1879	1507.7750	29.1514	78.5200	"
† "	1880	1360.2342	29.1724	78.2445	"
November..	1879	1631.1600	29.0636	81.8666	"
§ "	1880	1644.6979	29.0789	79.7193	"
December.	1879	1626.4100	29.0457	78.6774	"
"	1880	1860.9649	29.0794	79.5085	"

the Department of Beni to lake Titicaca, by way of Apolobamba, it is in a very bad state. Between this port and the lower one, called port of Salinas or Cavinas, there are three rapid places, and for this reason all rubber from below was left at the lower port. That no port of the river might be omitted in my map I started on April 28th, with a canoe and six Indians, to visit the lower port. The descent was made in three hours. As we passed the third current I had

* Aneroid observations made on the Beni River between latitudes 14° 15' 56" and 10° 20' South.

† Aneroid observations made on the Beni and Mamore Rivers between latitudes 10° 20' and 13° 44' 04" south.

‡ Aneroid observation to October 11, inclusive.

§ Aneroid observations from October 11, inclusive.

pointed out the place where the raft of the Cura Serabia overturned, which mishap cooled his zeal for the further continuance of the exploration. Working early and late we succeeded in returning by mid-day on the 30th. May 2d and 3d I occupied in going on mule-back to Tumupasa, which I found in latitude south 14° 07′ 48″, and San José being directly west of there on the river Tuichi, the correct positions of Tumupasa, San José and Ysiamas were determined (see map). Tumupasa is on the side of the Audisu chain, just above the forests, so that, looking eastward, one sees only a sea of verdure. To reach San José it is necessary to pass one mountain and descend to the valley beneath. Ysiamas is situated in the forests at foot and away from the mountains. Opposite Rurenabaque, on the west side of the river Beni, is a little town, called San Buenaventura. Between this town and Tumupasa there are fifty-three streams of various sizes which have to be crossed. The larger are only noted on the map. From Rurenabaque the upper Beni is traversed by rafts made from the "balsa tree" ("ochroma piscatoria"). These rafts are made by nailing seven logs together by means of strips of black palm. The logs are 5 to 8 inches in diameter. The rafts are from 25 to 30 feet long, and 5 to 7 feet wide. They are cut slanting to a point in front, and logs chosen with a curve so that the extreme bow shall be some two feet elevated, thus preventing the submerging of the front as it touches a current or fall. Into the fifth and fourth logs, counting from the centre, strips of black palm are nailed so that their top is one foot above the raft. Midway of these palm sticks are located stiff poles across the raft, and upon

them a floor of split bamboo, placed and fastened with strips of bark. The same is done to the upper part of the palm sticks. This forms an elevated platform with sides for the baggage and passengers. This platform is called "huaracha." Two cords of twisted bark, the size of a bed cord and 50 feet long, are tied to the bow, and a bit of board six inches long is set in lengthwise and lashed tight as a rest for a pole when towing. The Indian "balsero" by this means keeps the raft from the shore. Three men man a raft, two in front and one behind. Each is provided with a pole 18 feet long and a paddle. The raft is poled up stream, or towed when sand-bars or the shore permits, and the paddles are used in crossing from side to side as necessity demands. May 14th was passed weighing our baggage, provisions and persons, and assigning each balsas allotment 600 lbs., not counting the three "balseros." May 15th we loaded and started, having only four balsas and a scant number of men. Passing through the narrows (Eucañada), made by a crossing spur of the Andes, we began towing along a sand-bar, when a balsa and men arrived from above belonging to the man Don Manuel Cardinas, with whom we had engaged passage. We immediately camped and rearranged our rafts. May 16th we resumed our ascent in earnest, and passed another narrow place through a mountain that has a small hole through it near the top as if pierced by a cannon ball, which gives it the name "Eucañada de Bala." We camped at the mouth of the river Saius in latitude south 14° 34′ 51″. Up this stream were a party of men collecting Peruvian bark. May 17th, early in the day we passed the mouth of the river Tuichi, in estimated latitude south 14° 36′ 51″.

Rurenabaque being in 14° 26′ 21″ and Tumupasa 14° 07′ 48″ proves my map correct, even though differing from all others. Just below the junction the river is cut up with islands, the western bank being a yellow clay bank 70 feet high and the current very swift.

During the afternoon we passed the mouth of the river Quiquibey, and camped just above.

May 18th. Our progress to-day was very slow, as the river spreads very much and is full of large islands, the river Apichaua emptying in on the west. Towards evening we saw in front of us the appearance of five gable ends of the roofs of houses. They were the ends of mountains worn nearly perpendicular by the river during high water. We camped just above them. Our rain guage indicated 2.756 in. to-day. During the night the river rose so as to float our rafts from the sand-bar where they were drawn, it being necessary to draw the rafts out of water every night to prevent the logs becoming water-logged. May 19th was passed struggling amidst the islands and currents. Being obliged to cross the river where it was wide, rapid and deep, one of our rafts struck a snag and upset. This was our provision raft. Everything being securely lashed to the "huracha" and the raft finally brought to shore, we found ourselves deprived of all our sugar and bread; the former dissolved and washed away, the later soaked and spoiled. A cage full of small parrots was washed away and lost. May 20th we passed the river Sipuapio and camped at the base of a spur of mountains that here, crossing the river, follow down the river on the east side, and then jut out northeast into the pampas, their cut-off ends forming the gable ends referred

to as passed May 18th. May 21st was a perilous day for all. The river was narrow, with several faces of 400 feet perpendicular presenting to the river. This is called the "Eucañada de Veo," and one place where an island obstructs the river that there is a difference of level of two feet forming a fall. This is the end of steam navigation till this obstruction is removed. The little streams Sipita and Sama empty in this narrow gorge.

May 22d opened raining, and it poured all day, with a south wind and thermometer down to 62°. About 11 A. M. we ascended the river "Quendeque," Indian name "Integuo," to the junction of the river Chapi with it. There we met some Peruvian bark collectors encamped, who received us kindly. Ascending the Quendeque river four days, on balsas, one can arrive to within two-and one-half days of Apolobamba by mules.

May 23d. The rain having ceased, we descended the Quendeque and again began the ascent of the Beni. The river having risen some four feet, made the current very strong and the labor of our balsaros very heavy. May 24th, river fell 2½ feet during the night. Early in the morning we crossed the mouth of the River Caca on the maps, but called there Huauay. This river is formed by the junction of the rivers Mapiri and Tipuhuani. The river Mapiri has beside it the large plantation of Peruvian bark trees. Otto Richter, of La Paz, having one million trees. The river Tipuhuani is celebrated for its gold mines, "placer mines." We camped at the port of Meuchanis mission, latitude south 15° 10′ 08″. Fraile Padre Louis Fernandez, Padre Prefect of the missions, has a fine place here where

he instructs the Mositena Indians in morals, religion and civilization. Our reception was very cordial. His care is over the two missions, Santa Ana and Covendo above, and Tumupasa, San José, Ysiamas, San Buenaventura and Cavinas below.

May 25th and 26th. The river having few islands, less current, mountain chains on each side, separated from each other by a distance of about six miles, the river zigzaging from one chain back to the other. Passing the river Iniqua, we camped at the little collection of bark collectors' huts, to which they give the name Iniqua. May 27th. Found one of our best men this morning with tetanus, result of exposure during the rain and cold after the great fatigue of the passage of the Eucañada de Veo. At 8 P. M. he died. He was buried the next morning, and we heard his friends afterwards informed that he remained to cultivate bananas at "Iniqua," which they understood, as it is their custom to bury their dead in banana patches. I feared this would cast a gloom over the rest, but was surprised to find it rather gave them a topic for jests. May 28th. About noon we left Iniqua. At the same time a collector of bark, who had accompanied us from San Buenaventura, having fastened side by side two balsas, forming a "callapo," started down stream. He assured me he would arrive in three days, although we had occupied eleven in the ascent. Another spur of mountains cross the Beni here, forming the "Eucañada de Iniqua." We camped at the mouth of the little stream Mésere, in latitude south 15° 22′ 29″. Leaving this Eucañada the river is a succession of rapids, having 2 feet to 10 feet fall in short dis-

tances, and then long stretches of river with little current. Thus we passed May 29th and 30th, arriving at 12 M. of the 30th at the mission of Sta. Ana, Fraile Padre Cesario Fernandez receiving us with open arms. He took great interest in my maps and showed his, which, for one not skilled in the use of the sextant and compass, was a marvel of accuracy. It represented all the localities of the various tribes of Indians in Eastern Bolivia and Peru. To cheer our men I paid for a mass, and early on the 31st we were called by the tones of the church bell. The choir were all Mositenes Indians, and their instruments—violins, harp, "bajours" (made of palm leaves, and as fine-toned bass as any reed organ), flutes—were made by themselves, yet a more solemn and better mass I never attended, even though I had often attended the Twenty-eighth Street Catholic Church in New York City while a medical student. Having spent all night in fruitless watching for breaks in the clouds to make an observation, I had the satisfaction of a meridian altitude of the sun, which gave latitude south 15° 30′ 56″. As the Padre and his Indians had often visited Reyes, I had them examine and criticise my map, and they did it thoroughly, bend by bend, and after two hours' careful study told the Padre that it lacked nothing and could not be changed or corrected in any part. The Indians asked the Padre how it was possible that any one passing but once over the ground could be so exact. Above Santa Ana the river spreads out, forming many islands and becoming more rapid in its course. June 1st we camped at Chivoy, a collection of huts of the bark collectors, and June 2nd, at Huachi, another similar collection. Here we

spent June 3rd, 4th, and 5th drying our balsas, clothing and resting our men. Huachi is in latitude south 15° 39′ 25″, and 1422 feet above sea level. Estimated distance from Reyes by river, 325 miles, with descent of 662 feet, making an average of 2 feet per mile, while Reyes, distant 2,000 miles from the Atlantic by river, having 760 feet elevation, has but .38 of a foot per mile.

After moving the obstruction in the Eucañada de Veo, just above Huachi, the Beni river begins by the junction of the rivers from La Paz and Cochabamba. Railroads could easily be built to those two cities, following these streams. A short distance above the junction on the river from Cochabamba is the mission of Covendo. It was to this tribe, "Mositenes," of Indians that the German Folb went, and returning reported having found the origin of language. The ascent of the Rio de La Paz or Bopi was now before us, with its discomforts and dangers. June 6th, at midday we left Huachi. Scarcely had we ascended the Bopi, having risen 75 feet in two miles, when a sharp current nearly upset one of our balsas. June 7th we passed the two bad passes of Santa Felicidad; unloading we carried our freight some 300 feet; also that where the balsero, Juan de Lena, losing his life, gave name to that "mal paso." We stopped to breakfast where the river Cinco Machi empties into the Bopi and where we met bark gatherers.

At night we camped at the foot of the "mal paso" of "Tres Baucos." A peculiar botanical division of Peruvian bark exists here. Up the ravine of the river from Cochabamba the bark is green, but passing the crest west of that it is red. June 8th we passed the "Tres Baucos," "Mal paso

Chico Nos. 1 and 2," and arrived about noon at an island where a continuous succession of dangerous rapids, called "mal pasos," obliged the unloading of everything and passing the balsas at the rapids and loading again above. We were obliged to walk nearly a mile and a half through the rain, crossing both outlets of the river Chispani. At the residence of a bark collector we passed the night. The mountains now close in upon the river, giving but six hours of day. June 9th we passed the rapid Santa Rosa, the "Mal paso Ayuna," where there is 15 feet fall in 300 feet distance, and camped on some rocks, wet and tired, to pass a tedious night, it beginning to rain at 7 P. M. and continuing all night. Unrefreshed we resumed our journey. June 10th, we soon passed the river Lerco and mal paso of that name, then "Huachini" and "Huayreruni" "mal paso," at the latter unloading everything and with great difficulty passing the rafts. At "Chunehu Muerto" (dead Indian) "mal paso" the men have to pass the rafts singly up a current some 400 feet long. My balsa being last, I had the pleasure to see a balsa and two Indians descend this rapid. Naked, with only a handkerchief for breechcloth, with paddle in hands, partly crouching, they availed each movement of their rafts, and a dip here and there guided it safely, where one little false stroke or unguarded movement would give but another name to those recounted around camp fires as "those who had stopped to fish at the mal paso." These two men turned their raft beside mine and handed me a letter. News having been carried ahead by a man who left Huachi the day after our arrival, a sick bark collector had sent these men after me. Leaving my

raft and mounting their light unloaded one, I quickly passed the other rafts and began the ascent of the "Mal paso Chico," where there is a fall of 25 feet in 200. Our rafts passed the night just above this, while I, on foot, passed the "mal paso of San Fernando," wading the stream of that name. The "mal paso" of San Fernando is a fall of 8 feet in 20, with a large rock cutting the channel, these narrowed by projecting mountains on each side into two parts. I arrived at 6 P. M. at Porto Rico, the residence of the invalid. An acute attack of rheumatism from exposure was causing him suffering and fear of fatal results, common to these men. His wife was afflicted with a thickened cornea, a disease very frequently met with in the mountains of eastern Bolivia. At 2 P. M. our rafts arrived, the men exhausted with overwork and poor food. June 12th, we advanced a little, and the 13th we arrived at Siguani, the residence of Señor Cardinas, the owner of the rafts and with whom we had contracted to carry us to Mequillo, the head of balsa navigation. Here we remained, resting and drying our boxes till the 17th. From just below Porto Rico to Siguani the river bed is wider and the mountains more separated. Just above Siguani they again shut in on the river. June 17th, we passed the river Chaquites, with its bark huts and Señor José, and breakfasted at the foot of "Charia mal paso." Here we were obliged to carry everything a distance of 1,500 feet. Then we passed "Santa Rosa Foriati," "Mono Muerto rapid," the river Evenai and its houses, and camped at "La Asunta," a little village of bark collectors in latitude south, 16° 07′ 16″. We have now left behind us the Amazonian forests, and the moun-

tains are less densely covered. The valley here is wide and open. Across the river is "La Asunta de Belmonte," where Señor Belmonte has a large village of his workman and plantations of Peruvian bark trees. An American, Dr. Gove, lives here during the dry season, while working the gold mines on the river Cajones, a short distance above. June 19th, we passed the river Quinuni. Just beyond, the river runs west and east. We camped at Charobamba. Colton's map represents this as a town, and so it was a few years ago, but being composed of bark collectors, and the bark having given out, all left except the great percentage who accepted residences underground. We found only one little hut here. The difficulties of the passes above made it necessary that we leave here a part of our baggage, to be sent forward by mules as soon as possible, La Asunta having a good mule road connecting with La Paz. June 20th, a short distance above Charobamba, on the right bank, the mountain is perpendicular to the river, and has a beautiful cascade of 100 feet fall. Near by, the river is narrowed to 40 feet by two projecting points of rock, now six feet above the surface, making an almost impassible passage in high water. To-day we passed what on Colton's map is called Rio Vacas, but is in reality Arcopongo river.

June 21st, we passed the river Tumanpaya, which comes from the valley of Chulumani. Our river has become quite small and rapid, being a steady pull for the men. The hills more open and nearly free of trees, rising to three and four thousand feet above us. Passing two very bad passes, we came towards the "Eucañada de Viniqui" at 3 P. M. The valley is crossed by a solid rock more than a hundred

feet high. Through this the river has cut a curved channel, leaving the walls perpendicular. Above, the river bed in high water is 500 feet wide and a sand-bar deflects the river to the obstructing rock, which, turning its course, throws it directly against the side of the mountain, where it ascends to a height of fifteen feet, crests and falls over, then rushes whirling into the narrow channel, thus forming the most difficult and dangerous pass on the river. Here we nearly lost a balsa and Mr. Fetterman and his wife. We now meet Maguey plants and the Molle tree. The sides of the hills and sand-bars show saltpetre. The mountains now have only grass on their summits instead of trees. June 22d, we passed the river Zuri. Three miles above its mouth the river Vacas joins with the Zuri, forming the Zuri junction. June 23d, we pulled our balsas out on dry land for the last time, near the mouth of the river Miguillo, in latitude South, 16° 29′ 32″. We now took mules and went west over the mountains into the Tumanpaya Valley and stopped at Irupana. Observations of a star in the south, another in the north and meridian alt. of sun gave for Irupana 16° 29′ 09″. Uriguillo we found 3,350 feet elevation, having risen 1,125 feet in a distance of 150 miles. Although we had been from May 15th to June 23d in the ascent from Rurenabaque to Miguillo, it only takes seven or eight days to descend that distance.

July 21st. We left Irupana with mules and returned to the river bed, and continued our ascent. July 22d we passed the Chungamayo, a stream coming from the snows of Illimani, whose snow-capped top can be seen looking up that ravine. July 23d, we passed through the narrow

gorges that the river has cut through and the river Caricata, which was our extreme point south. We now directed our course to the north and west. July 25th, at 2.30 P. M., we arrived at La Paz, the end of the ascent of the Beni and La Paz rivers. The Bolivian Government was much gratified with my work. To give an idea of the tediousness of our journey from Reyes to La Paz is impossible, but that there is danger when one is shut up in the cañons we will quote the following from the notes of Ivon D. Heath, companion of Jas. Orton, in May, 1877:

"The Professor had been eager to press forward, so that in spite of the advice of friends we found ourselves in the great forests of the lower mountains at least three weeks too early in the season. We encountered floods of rain and torrents of water. Our pack mule and all fell into the deep torrent of a river. Gnats surrounded us in clouds. We were bitten by them until it was not possible to close the swelled hands. We wore masks to protect the face.

"It was necessary to travel ten leagues along the base of the mountains to reach the river Chimoré, where we would find canoes. In the middle of the afternoon we arrived at the Coni river, but finding it too deep to ford on account of rains of previous night, we camped in the dry bed of the river, a mile from shore, on a high sand-bank, near which grew a clump of willows and wild cane. Some Yuracare Indians, whom the Cacique had sent with us from Pachimoco, with surprising skill constructed for us a perfect shelter out of the wild cane. They then swam the river, promising to return early next morning with canoes to ferry us over. The night closed in dark and stormy. There

were with us two muleteers from Cochabamba. They built bonfires to protect ourselves and mules from tigers. By ten o'clock the rain poured in torrents; the thunder was deafening. The lightning was continuous, and of intense brilliancy. The river began to rise. In an hour it had risen fifteen feet; it was within a few inches of our shelter and still rising. There was danger. The water invaded our hut; it was eighteen inches deep. We were alarmed. It was time. We drew on our boots and stepped down into the water. We piled our eight trunks together and held them down with poles to keep them from floating away. Only two trunks were above water. The storm ceased, the darkness was intense. We stood in three feet of water. We looked death squarely in the face. We talked of home, family, friends. We gave up all for lost. Huge trees swept by us. The tigers growled, the tapirs bellowed, the monkeys chattered, the birds uttered notes of alarm. From the opposite bank masses of earth, with portions of the forest, went down in the flood. After five hours, daylight came. We could see no land. A shout was heard—another and another—but in what direction we could not tell. We answered at random. Two hours later shouts were again heard, and this time from up the river, and in the distance, among the floating *débris*, could be seen the heads of swimming men. They touched bottom and waded to us—a score of Yuracare Indians—great, powerful fellows. Never were happier men than ourselves. They were friends; we were saved."

Hieroglyphics,

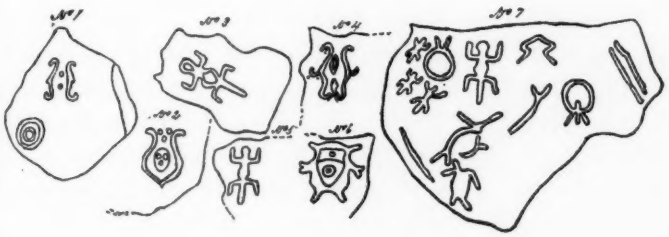
Found on Rocks at the Falls and Rapids of the Rivers Madeira and Mamoré.

Whether there are hieroglyphics at the falls of "Theotonio" and the rapids of "San Antonia," "Macacos," and "Morrinhos," we cannot say, never having had our attention directed to seeking them while there.

By accident we found some at the rapids at the foot of

caldieráo do inferno.

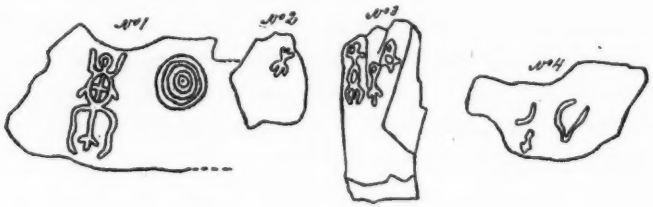
Nos. 4 and 2 are figures on the same rock, side by side. No. 1 is another face of the same rock, 10 feet across. Nos. 5 and 6 are on the upper surface of a rock, and No. 3 on one of its sides near the bottom. No. 7 is upon a rock 15 feet above the surface of the river. Many more were on the other rocks, but our time did not permit further copying. Mr. T. M. Fetterman, my companion, and myself sketched as fast as possible.



The moment we arrived at the falls of

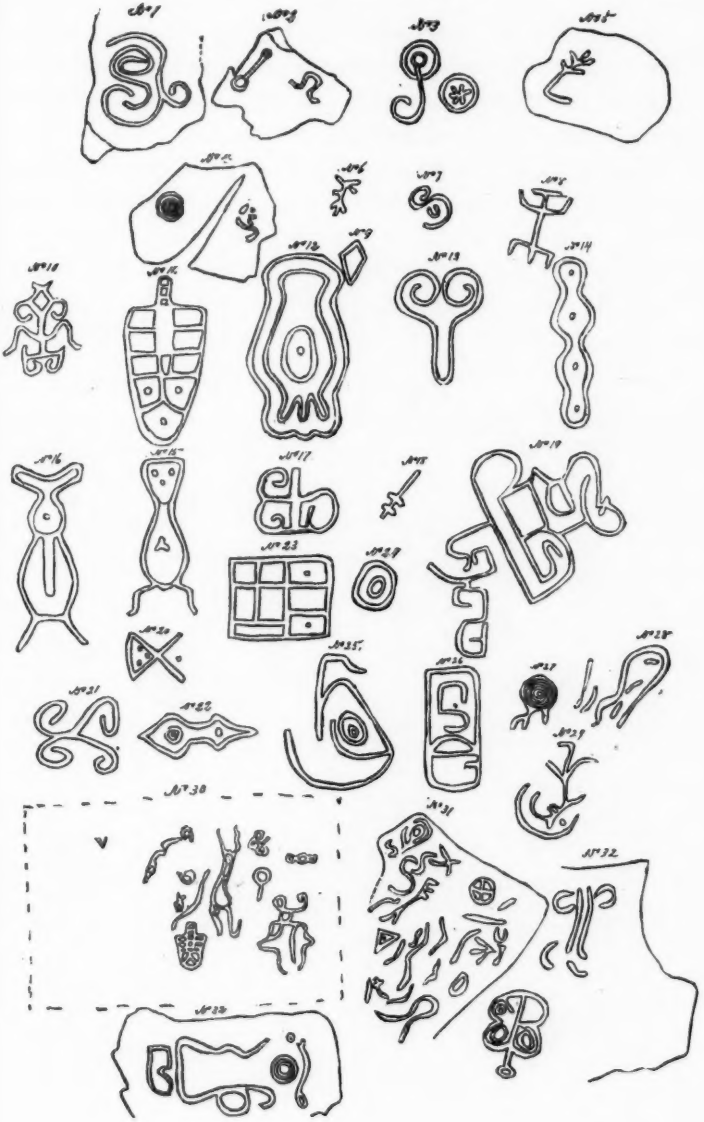
GIRAO

we searched for stone carvings, finding a few and several repetitions of circles similar to those already found. Nos. 1 and 4 are on the west and east side of the same rock, which is 9 feet in length. The figure is 21 inches high, the five circles 1 foot across. The east side was almost obliterated. Nos. 2 and 3 are on loose stones. No. 2, facing west, is 16 inches long, rock 50 inches long and 35 wide. East end of No. 3 has a similar figure to No. 2. Fig. 3 is 22 inches long, rock 70 inches long by 27 inches broad, and was 30 feet above the river at date. The rocks are basaltic in form, dipping north at an angle of 86°. Many small stones, one and two feet in diameter, lie about with marks on them nearly defaced.



AT PEDERNEIRA

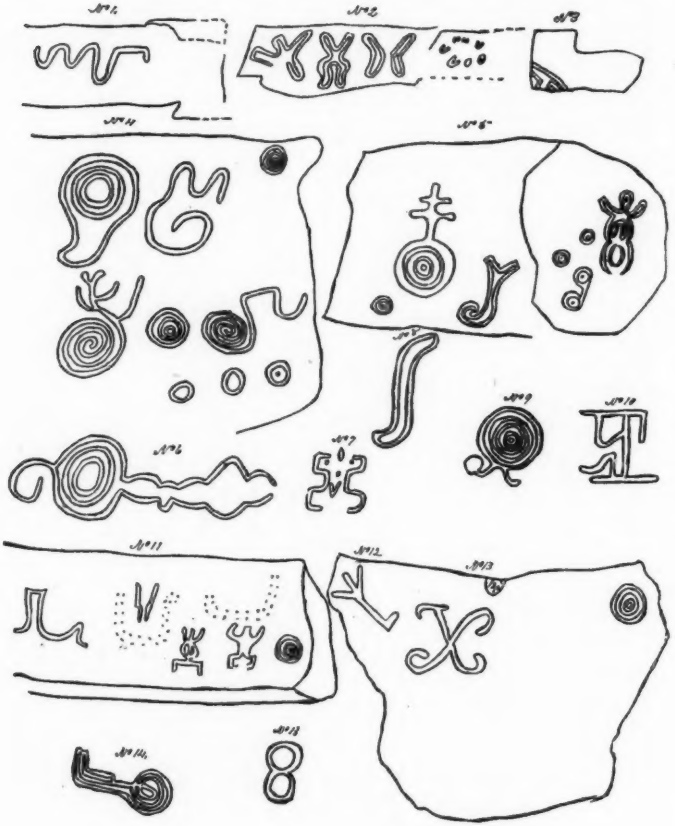
all the rocks on the right side at the foot of the rapids are literally covered with figures. No. 1 is on a large boulder facing the south. No. 31 has joined to its right side No. 33. Nos. 21, 22 and 18 are on the same stone. Most of these rocks are only a few feet above low water and are covered at least eight months each year.



AT ARARAS RAPIDS

the river is very wide, two islands and a rocky ledge crossing the river from the rapid. Nearly all the rocks on the right bank are covered with figures.

Having no small canoe, we could not pass a small channel so as to gather copies of the figures we could see at a



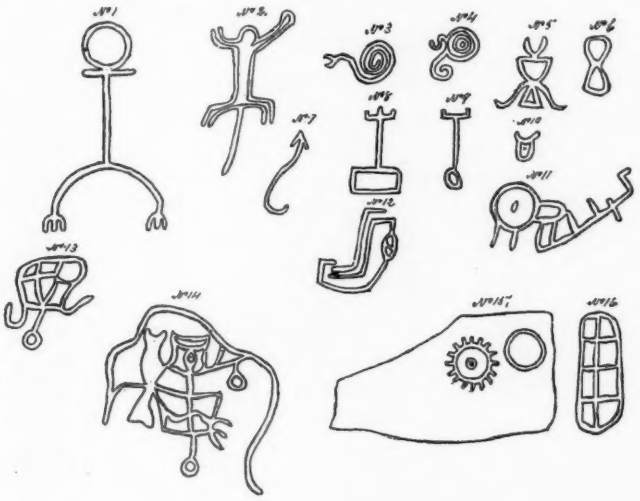
distance, for which I grieved, at the time, wishing to make my work as complete as possible.

The approaches, both above and below the rapids and falls, "are many times" as difficult to pass as the rapid or fall itself, giving rise to the division into "head," "body" and "tail."

Some not only have these divisions, but also have these subdivided into "head, body and tail." One is constantly hearing "el rabo," "el rabo del rabo," "el rabo del cuerpo," or "cabeza," and so on.

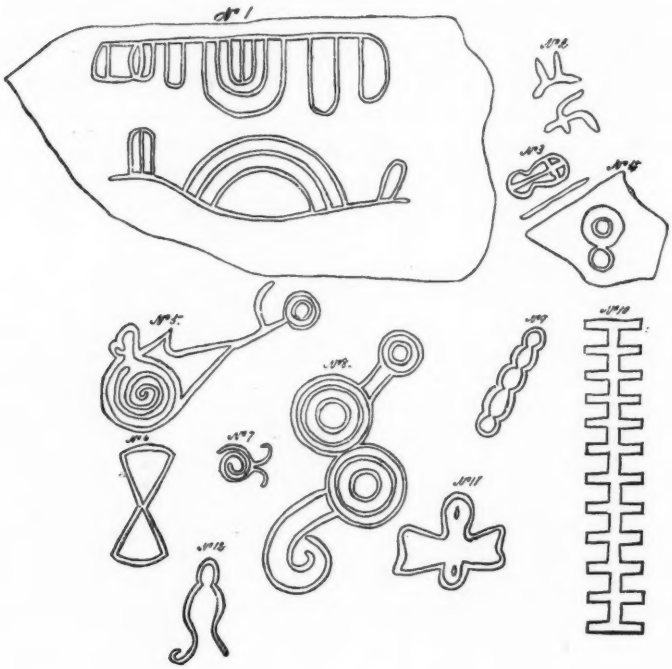
PERIQUITOS RAPIDS

connects so closely with the tail of "Riberáo," that it is difficult to say where one begins and the other ends. Our stop at the rapid Periquitos was short, yet productive of a few figures, one rock having apparently a sun and moon on it, the first seen of that character.

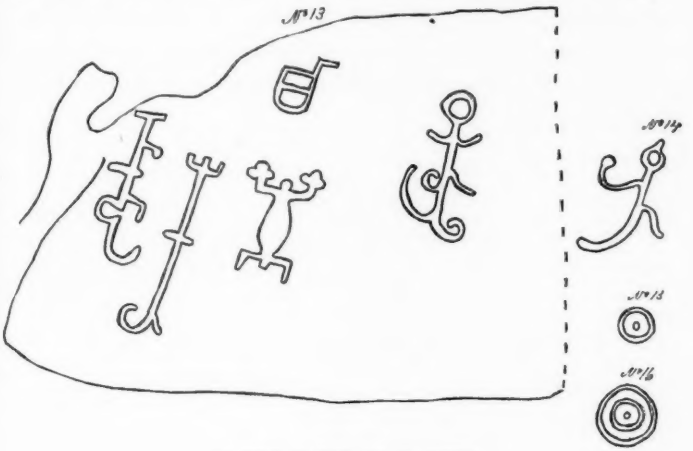


RIBEIRÁO.

The tail of the rapid is three miles in length, a continuous broken current and fields of rocks. It is here on a rock, but a foot or two above the river, that the hieroglyphic shown in F. Keller's "Amazon and Madeira" is found. As both Mr. Fetterman and myself made copies of it, unknown to the other till finished, our copies may be relied on, although differing from Keller. The length of the upper part is 45 inches, and of the lower 36 inches, with 13 inches depth of each.



No. 10 at one time was as clearly cut as we represent it, some of the edges being yet clear and distinct. On some solid water-worn rocks, at the edge of the fall, are the following figures. There were many fractional parts of figures which we did not consider of sufficient value to copy.



AT THE RAPID OF MADEIRA

there were a number of circles similar to 15 and 16 at Ribeiráo. On a ridge of rocks in the middle of the river, just above

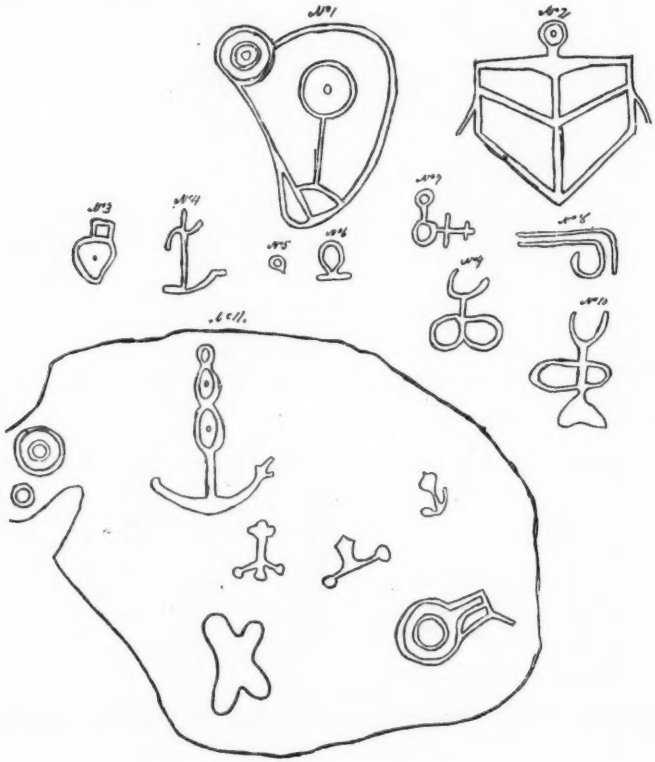
LARGES RAPIDS

are figures, and we had only time to sketch one.

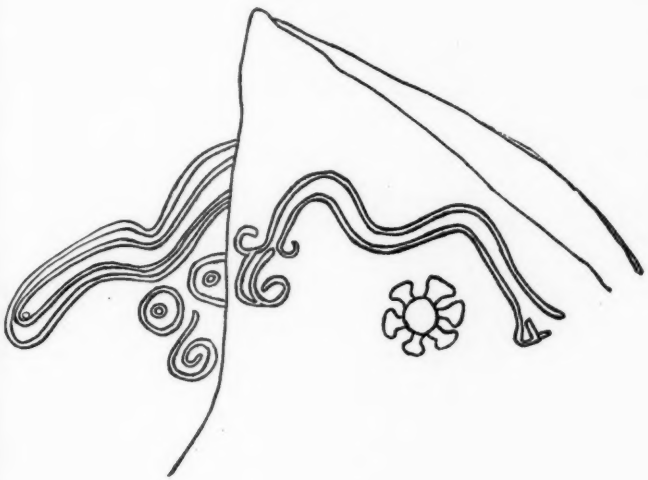
AT PAO GRANDE

we had a better harvest, showing evidently a later period

than the former. One could easily believe these were made at the time of the Spanish conquest, the anchors, shields and hearts being so often found in Spanish religious rites. Without doubt these were notices for navigators, as they were only out of water and seen when that passage was dangerous. Where projecting points of rock gave a face both up and down stream, the same figure was on both faces. These rocks are syenitic granite and are cut to a depth of a half inch.



Just above Rurenabaque, the upper part of Reyes on the Beni river, there is a dangerous place in high water and on the angular face of a rock, some 8 feet above low water mark, was found this figure:



NOTE.

The manuscript and proof of the foregoing Paper were sent to Dr. Heath, but miscarried in the mail; hence occurred some trifling errors, chiefly in the spelling of names of persons and places.

THE FRONTIERS OF THE UNITED STATES,

BY

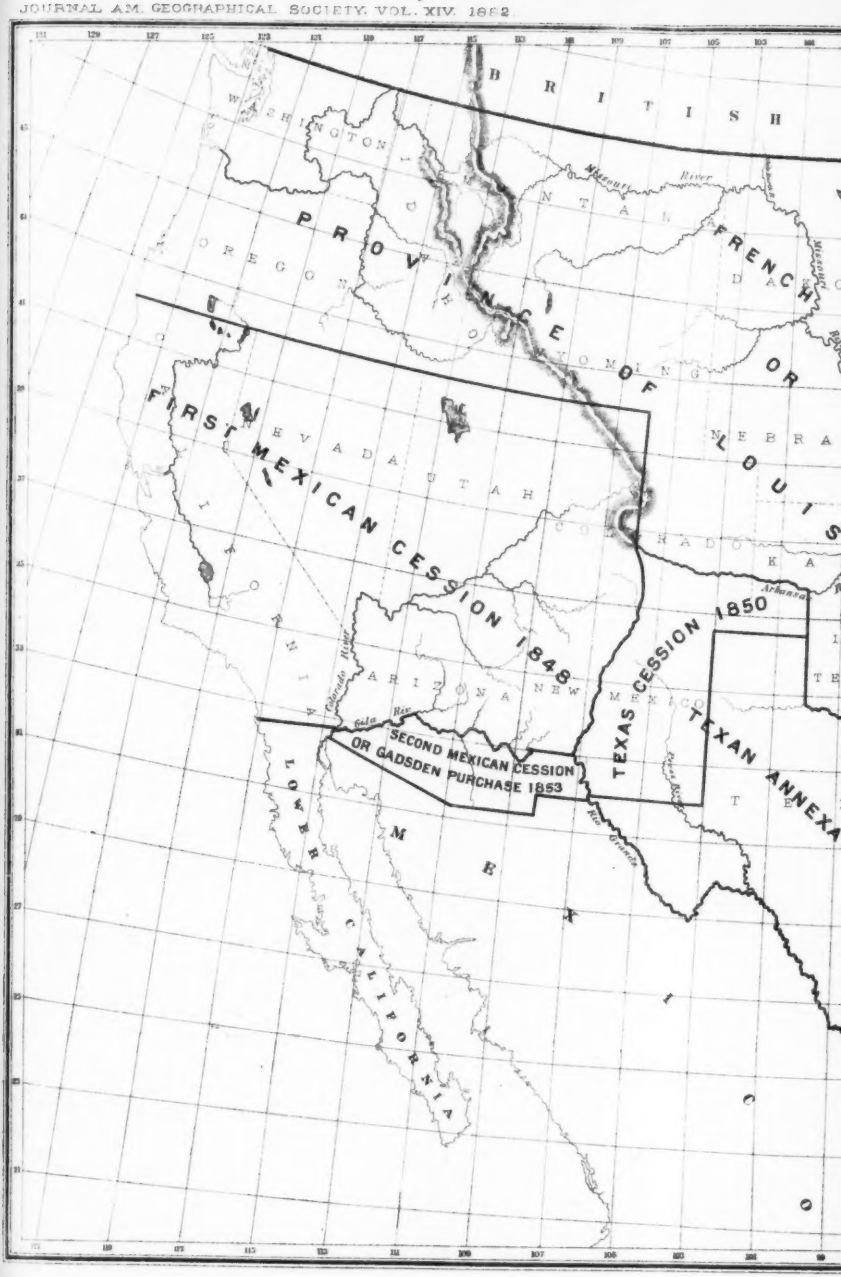
GENERAL EGBERT L. VIELE,

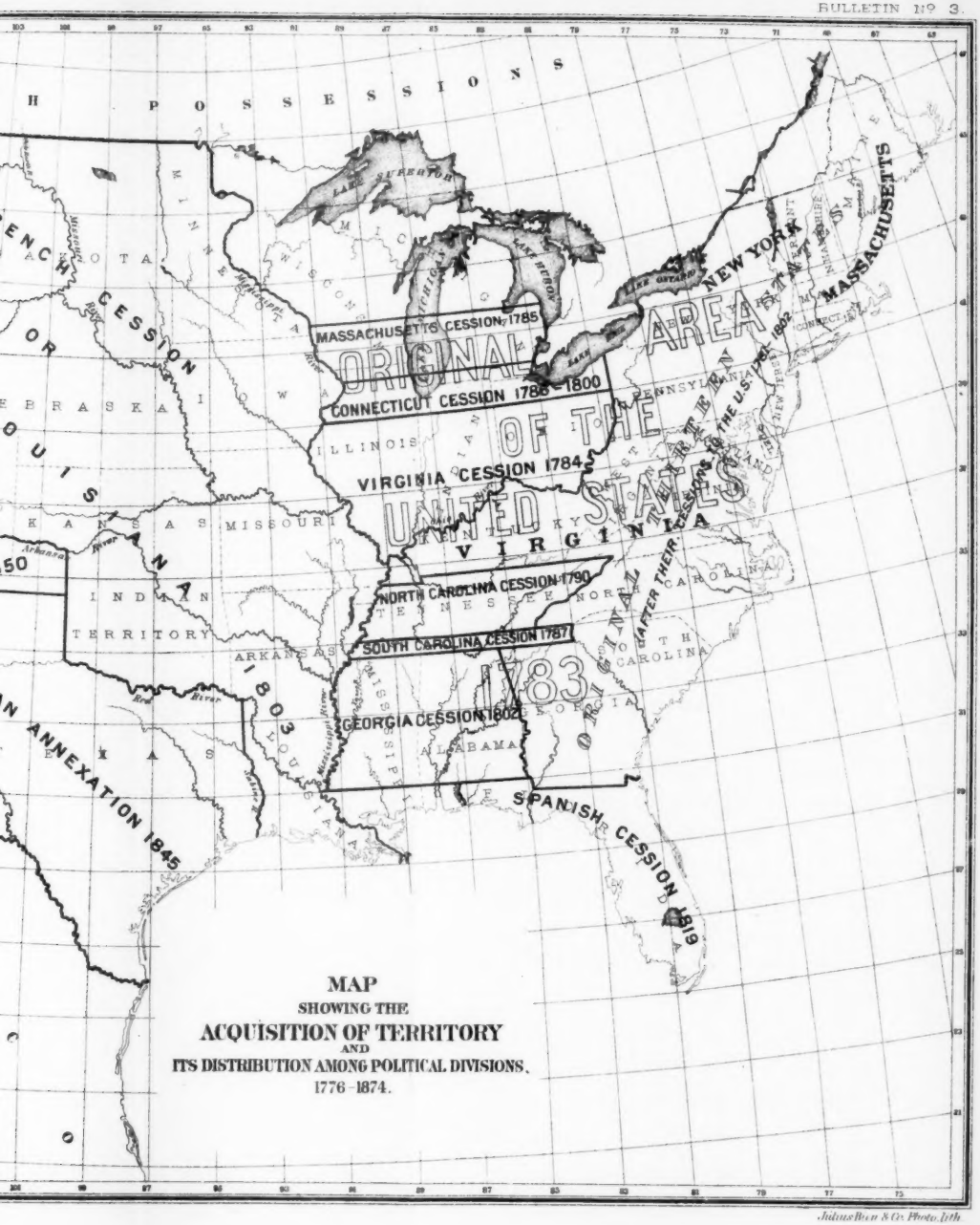
Member of the Council of the Society.

The frontiers of any country are the boundaries that separate it from its neighbors. Sometimes they are great natural topographical features like mountain chains, or rivers, but frequently they are arbitrary lines, shifted from time to time by the caprice of rulers or the injustice of the more powerful.

Our frontier, like the receding shadow-line of the sun dial that marks the hourly passage of time, has receded towards the West under the influence of the advancing sun of civilization, until at a long distance it has reached the shores of the great Western Ocean, beyond which it can go no further.

The recession of our frontier is the most important and the most interesting fact of our national history, embracing a series of events as brilliant in statesmanship as they are unstained by wrong or injustice. The original thirteen colonies, that asserted and achieved their independence, comprised an area of little more than 300,000 square miles. The United States of to-day contains more than 3,000,000 square miles, and every foot of that territory has been acquired by peaceful cession on just and equitable terms. It is true that a race of men, more powerful and more numerous than the invincible hordes that swept over Europe and buried its civilization beneath the pall of the Dark Ages, has gradually and almost totally passed from


B R I T I S H
PROVINCE OF
FRENCH
LOUIS
FIRST MEXICAN CESSION 1848
TEXAS CESSION 1850
SECOND MEXICAN CESSION
OR GADSDEN PURCHASE 1853
TEXAN ANNEXA
LOWER CALIFORNIA
M E X I C O
WASHINGTON
OREGON
NEVADA
UTAH
ARIZONA
NEW MEXICO
Missouri River
Colorado River
Gila River
Rio Grande



MAP
SHOWING THE
ACQUISITION OF TERRITORY
AND
ITS DISTRIBUTION AMONG POLITICAL DIVISIONS.
1776–1874.

Julius Bien & Co. Photo. Lith.

existence—a race that covered the continent from ocean to ocean—and has given place to a nobler and a higher civilization, but it has been without shock and without crime.

More than a century elapsed between the discovery of America by Columbus and the first settlement on the Atlantic Coast by Europeans. More than another century passed before the infant colonies had crystalized into a nation; and still another century glided by before the present existing frontier of the United States was established. These 300 years of progressive development have a history as brilliant as it is varied in its coloring—like a gorgeous piece of tapestry, some of its threads are golden, some are silver and some are crimson with the life-blood freely shed; but they are all interwoven into one grand picture of civil and religious freedom such as mankind has never in all the ages looked upon before.

Three hundred years ago Spain, France and England were the great powers of the earth on land and sea. Each of these nations contended for the mastery of the New World. Spain, from her possessions in Mexico, advanced with rapid strides towards the North. Her footsteps were heralded by the daring and adventurous of her chivalrous sons. France, from her possessions in Canada, advanced towards the West, where the voyageur and the priest led the way into the Wilderness. England, from her settlements along the Atlantic seaboard, scaled the Alleghanies, and pressed forward towards the Mississippi.

It was thus the New World became the arena of a conflict between these great nationalities, seeking dominion and power; but not one foot of the soil then claimed and held and fought for with so much tenacity, and at such a cost of blood and treasure, now acknowledges the flag that then

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waved over it. A new race, a new people, and another form of government cover the territory from ocean to ocean, and sixty millions of freemen enjoy its blessings in unity, peace and industry. Let us glance for a moment at the gradual absorption of this vast region by the American Republic.

Prior to 1781 six only of the original thirteen States, viz.: New Hampshire, Rhode Island, New Jersey, Pennsylvania, Maryland, and Delaware, had exactly defined boundaries. Of the remaining seven States, some claimed to extend to the Pacific ocean and others to the Mississippi river. The States within exact boundaries ceded their claims to lands west of their present limits in succession, as follows: March 1, 1781, New York; March 1, 1784, Virginia, the cession including the State of Kentucky and the parts of the States of Illinois, Ohio and Indiana which lie south of the forty-first parallel.

Virginia reserved from this cession for military bounty lands the entire territory, 6,570 square miles, between the Sciota and Little Miami rivers, from their sources to the river Ohio. April 19th, 1785, Massachusetts, including her claims to territory west of the present western boundary of the State of New York. September 14, 1786, Connecticut, the cession being the territory between the parallels of 41° and 40° 2′, and west of a north and south line drawn one hundred and twenty miles west of the present western boundary line of the State of Pennsylvania. Connecticut then ceded all land and jurisdiction west of that territory, now situated in the State of Ohio, and yet known as "The Western Reserve of Connecticut." August 9th, 1787, South Carolina, the territory ceded being a strip of land about twelve miles wide, south of the thirty-fifth parallel,

and extending along the southern boundaries of the States of North Carolina and Tennessee to the Mississippi river, February 25th, 1790. May 30th, 1800, Connecticut, yielding all territory and jurisdiction west of her present area, and reserving the right of soil in the "Western Reserve," which lies between the parallels and meridians above recited. June 16th, 1802, Georgia, receiving that part of the cession of South Carolina lying within her present limits, ceded all between her present western boundary and the Mississippi river, and between the South Carolina cession and the thirty-first parallel. The foregoing cessions secured to the General Government all territory ceded by Great Britain not included in the original thirteen States, as in the main now bounded. November 25th, 1850, the State of Texas ceded all her claims to lands west of the twenty-sixth meridian (103d Greenwich), and between 32° and 36° 30′ of latitude.

Cessions by Foreign Powers.—September 3d, 1773, by treaty with Great Britain, the territory of the United States was declared to extend from the Atlantic ocean westward to the Mississippi river, and from a line along the great lakes on the North, southward, to the thirty-first parallel and the southern border of Georgia.

April 30th, 1803, by treaty with France, the "Province of Louisiana" was ceded. Its western boundary as finally adjusted, February 22d, 1819, by treaty with Spain, ran up the Sabine river, to and along the seventeenth meridian (94th Greenwich), to and along the Red river, to and along the twenty-third meridian (100th Greenwich), to and along the Arkansas river, to and along the Rocky mountains, to and along the twenty-ninth meridian (106th

Greenwich), to and along the forty-second parallel to the Pacific ocean. Its northern boundary has conformed to the boundary established between the British possessions and the United States. On the east it was bounded by the Mississippi river as far south as the thirty-first parallel, where different boundaries were claimed. The United States construed the cession of France to include all the territory between the thirty-first parallel and the Gulf of Mexico, and between the rivers Mississippi and Perdido, the latter of which is now the western boundary of the State of Florida.

Under this construction of the cession, the "Province of Louisiana" is now covered by those portions of the States of Alabama, and Mississippi, which lie south of the thirty-first parallel; by the States of Louisiana, Arkansas, Missouri, Iowa, Nebraska, Oregon, Minnesota west of the Mississippi river, and Kansas, the small portion thereof south of the Arkansas river and west of the twenty-third meridian (100th Greenwich); by the Territories of Dakota, Montana, Idaho, Washington, and that known as the Indian country; and by the portion of the Territory of Colorado lying east of the Rocky mountains and north of the Arkansas river, and all of the Territory of Wyoming north of the forty-second parallel, and that portion of the Territory of Wyoming which is south of that parallel and east of the Rocky mountains. In 1800, however, the "Province of Louisiana" had been ceded by Spain to France, Spain claiming that she ceded to France no territory east of the Mississippi river, except the "Island of New Orleans," and also contending that her province of West Florida included all of the territory south

of the thirty-first parallel and between the Perdido and Mississippi rivers, except the "Island of New Orleans."

Under this construction, the "Province of Louisiana" included on the east of the Mississippi river only the territory bounded on the north and east by the "rivers Iberville and Amite and by the lakes Maurepas and Pontchartrain."

February 22, 1819, Spain formally ceded the territory now covered by the State of Florida and by those portions of the States of Alabama and Mississippi which lie south of the thirty-first parallel, and by that portion of Louisiana which lies east of the Mississippi river and is not included in the "Island of New Orleans."

This territory was styled by Spain the "Provinces of East and West Florida." Previous to this cession, by the authority of the joint resolution of January 15, 1811, and the Acts of January 15, 1811, and March 3, 1811, passed in secret session, and first published in 1818, the United States and the United Mexican States, the boundary of the "Province of Louisiana," which was established by treaty with Spain when Mexico was a part of the Spanish monarchy, was agreed upon as the boundary between the two Republics.

December 29, 1845, Texas, formerly a portion of Mexico, and later an independent republic, was admitted to the Union.

February 2, 1848, Mexico ceded the territory now covered by the States of California and Nevada; also her claims to the territory covered by the present State of Texas, by the Territories of Utah, Arizona, and New Mexico, by portions of the Territories of Wyoming and Colorado, and by the unorganized territory west of the Indian country, except

that part of the Territory of Arizona and that part of the Territory of New Mexico lying south of the river Gila and west of the old boundary of New Mexico, which lands were ceded by Mexico December 30, 1853, and are known as the Gadsden Purchase.

By treaty of March 30, 1867, exchange of ratification and transfer of title having been made June 20, 1867, Russia ceded Alaska. This cession made the line between the continent of Asia and America the northwestern boundary of the territory of the United States, and extended the territory of the United States northward to the Arctic ocean. On the east this cession was bounded by a line beginning at the southernmost point of Prince of Wales island (parallel of 50° 40′) and running north along Portland channel to the junction of the fifty-sixth parallel of north latitude with the continent, and thence along the summit of the mountains parallel to the coast, to and along the one hundred and forty-first meridian to the Arctic ocean.

But where the crest of the mountains skirting the coast from the specified parallel to the meridian is more than ten marine leagues from the ocean, there the boundary is a line not more than ten marine leagues from the coast and parallel to its windings. This cession is separated from the main territory of the United States by the western part of the British possessions between the parallels of 54° 40′ and 49° of north latitude.

The lines of the present frontier of the United States are therefore those that separate this country from Mexico on the southwest and from the British possessions on the north and northwest. These lines are: First, the Rio Grande from El Paso to the Gulf of Mexico; second, the east and west line from El Paso to the Pacific at San Diego; third, the

St. Lawrence and the lakes; fourth, the arbitrary boundary from the Lakes to the North Pacific ocean.

1st, The Rio Grande Frontier.

Away up in the very heart of the Rocky mountains, on the crest of that great upheaval that forms the "dome of the continent," lie those three wonderful basins known as the North, Middle and South parks. From these three parks issue the beginnings of three mighty rivers that drain a vast area of country. From the North park, the "Platte," that turns toward the northeast and, after many miles of wandering, empties into the Missouri; from the Middle park, the "Colorado of the West," which turns its course westward, and flowing through many leagues of vast cañons, pours its waters into the Gulf of California; from the South park, the "Arkansas," separated by an almost imperceptible "divide" from the waters of the Platte, flows southeasterly, and, with its immense volume increased by numerous branches, empties into the Mississippi. Below these three parks there is still another, larger in its area than the other three combined—the park San Luis. From this broad basin issues that remarkable stream known as the Rio Grande, or Rio Bravo del Norte, that flows to the south for 2,000 miles of falls and cataracts and devious windings, and empties into the Gulf of Mexico. Through seven degrees of latitude, and for a distance of a thousand miles, the Rio Grande forms the north and south boundary between the United States and Mexico.

Although designated by the Mexicans, in their stilted phraseology, the Rio Bravo del Norte, or Magnificent River of the North, it is grand only in name, being almost worthless as a river, as it is unfit for navigation except for

a comparatively short distance from its mouth, and nearly useless for irrigation; a mere brook in width for hundreds of miles, having but one affluent of any importance (the Pecos), depending for its supply of water principally upon the melting snows of the Sierras, from whence it takes its rise. As a boundary line it is in no sense a barrier, either to the depredations of the roaming hordes of savages or the scarcely less barbarous Mexicans. It can be forded at almost any point, and to the well-organized bands of smugglers that infest its banks it is a great convenience and a prolific source of fraud upon the revenue. The long valley which it drains, but does not water, is the least inviting and most sterile portion of the United States.

Along this extended line, two widely distinct races confront each other—as distinct as if they inhabited separate continents; distinct in color, language and religion, and in all the habits, manners and customs of life. Under no possible circumstances could these two people commingle together. The one—restless, vigorous, progressive; the other—listless, demoralized, effete. The surging tide of American civilization here treads upon an uninviting shore. The social wrecks that are always found along a frontier form a large portion of the population of both nationalities on either sides of the river, and, as is always the case under such circumstances, this driftwood of humanity possesses little in common save the vices which are common to both people.

This unattractive region is the last portion of the great central basin of America that rose from the sea in which it was formed, and almost universal sterility gives evidence of the comparatively recent period when that event took place. The long lines of treeless hills have no vegetation

but the thorny and stunted chapparal, while in the depressions the agave and cactus contest with the coarse, wiry grasses for the little humus that is found in the soil: this very soil yielding salt on analysis, while salt water is found almost anywhere at fifteen feet below the surface, five hundred miles from the sea coast, at an elevation of several hundred feet. All nature seems to be plunged into a sea of despair from which it cannot rise. The climate on the aggregate is sub-tropical, but torrid heat prevails during the summer months. In the hottest periods of the year, the mercury indicates a temperature of one hundred degrees in the shade for weeks at a time, frequently rising to one hundred and fifteen degrees; at such times hot, dry winds, comparable to the simoons of Arabia, blow from the parched plateaus of Mexico, wilting the scanty vegetation and compelling the closing of doors and windows to exclude the dust and heat. At these times human existence is reduced to a forced inanition; listlessness, weariness and in utter dissatisfaction with life and all its surroundings becomes the habitual condition. The few half-developed natives that move about are simply engaged in gathering the little spontaneous vegetation that affords them the means of maintaining their purely animal existence. In mid-day the hush and stillness of nature are painful. It would seem as if even the lowest forms of animal life had yielded to the general prostration and fallen into silence and apathy, or, burrowing into the earth, had sought to escape from the oppressive heat that paralyzes every motion.

Desolate and dreary as all this is, yet this same unattractive and nearly barren region has been the scene, for a period extending back several centuries, of some of the most important events that have been enacted on this con-

tinent. So long ago as the year 1540, the Spaniards had occupied a portion of this valley, and contested its proprietorship with the aborigines. Five and twenty years before the arrival of the Pilgrims in New England, and twelve years before any permanent settlement had been made on the Atlantic by either England, Holland or France, the flag of Spain waived in full possession over all this territory.

Rivers have always been the chief element in determining the location of towns and cities. Their valleys, on account of their greater fertility, naturally attract the husbandman. Facilities for transportation aid in the development of commercial intercourse, and thus cause an increase in population. At the riverside, also, the aboriginal tribes found it easier to sustain their existence, which was wholly dependent on the spontaneous products of nature.

When, therefore, the propagandists of the sixteenth century sought to proselyte the New World to their faith, rivaling the crusaders in their self-sacrifice and courageous zeal, they followed instinctively the lines of the great rivers, for there they found the richest human fields from which to reap a harvest of souls for the Kingdom that is not of this earth. How well they did their work, how patiently they labored, the ruins of a thousand missions, scattered over Texas and Mexico, testify with unmistakable force. Some of these missions are yet surrounded by the wilderness in which they were first planted, others have become the foundation of cities, and all bear witness to an almost incredible amount of energy and perseverance, born of a sublime faith and prosecuted under difficulties as great as were ever surmounted by human effort.

The earliest records we have of this region are gleaned from the narratives of these remarkable men, half priest,

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half soldier, who, after aiding in the subjection of the Aztecs, spread themselves almost single-handed over a vast extent of territory—uninhabited, save by numerous tribes of savages, whose very existence was almost unknown to each other. Led on by visions more brilliant than those of Cortez, fired equally by religious zeal and ambition, these modern crusaders braved danger with more than military ardor, and met death with a martyr's enthusiasm. With their numbers diminished and still decreasing, they pressed on and on, until they had penetrated into the heart of the Continent, where for centuries the wild idolator had offered sacrifices upon the altar of an unknown god.

Descending the water-courses to the Gulf of Mexico, they sought, with the cross in one hand and the sword in the other, to conquer and to colonize the Indian tribes that swarmed over the wild prairies. Their efforts were time and again frustrated, and the daring adventures paid to their enthusiasm the forfeit of their lives.

Success at length seemed to crown their labors, and a number of flourishing missions were established on the Rio Grande, the remains of which still exist, forming the nucleus of considerable towns, which are now, on both sides of the river, the principal centres of the frontier population.

These little communities were allowed for a number of years to flourish and develop undisturbed, but while thus reposing in fancied security, an unseen storm was gathering around them. The wily savages of the plains, true to the instincts of their untamed and rapacious nature, swept down upon a large number of these incipient colonies, and ruthlessly murdered all within their reach. Most of the missions were for a time abandoned, and many of them completely broken up. Interrupted in their great work,

the faithful followers of the cross were not foiled in their efforts, nor were they discouraged nor disheartened. New leaders, equally zealous and devoted, were found to replace those whose lives had been sacrificed, and again the missions sprang into existence with renewed vigor. It would have been impossible for a merely military force to have accomplished what these men achieved. Military support was necessary at first to enable them to commence their labors, and a small detachment of soldiers generally formed part of every mission; but they were soon strong enough from the accession of converts to take care of themselves.

With wonderful patience and perseverance the Indians were brought gradually under civilizing influences. The minds of these simple children of the forest were peculiarly susceptible to the fascinating influences of the Catholic faith. A constant intercourse with nature develops those faculties which are most readily inspired with awe, and it is easy to imagine the effect upon them of the glowing descriptions of the joys of heaven that await the true believer, or of the fearful anathemas and eternal misery that as surely follow the unbeliever into the world to come. So eager were these zealots to add to their followers that they even embraced the superstitions of those they desired to proselyte—incorporating into the new faith the myths and legends that tradition had handed down to the Indian. Thus, by slow yet sure degrees, they made their converts. Planting the simple cross in the wilderness, they gathered around it the dusky denizens of the plains, and taught them praise and prayer, the rudiments of agriculture and the pleasures of a peaceful life.

From these oases of intelligence in a desert of ignorance

there sprang the potent agencies by which the Indian was raised to a higher plane of existence, and out of which has come the greater part of what there is of civilization in Mexico at the present time. I dwell upon this, because in no other way can we understand the abnormal position that Mexico occupies among the people of the earth, as a nation with the mere semblance of a nationality and a people without an apparent purpose.

Out of the 12,000,000 inhabitants of Mexico, but 1,000,000 may be regarded as white; the rest, constituting the great bulk of the population, are mixed races or pure Indians; and when we discuss the elements of antagonism that present themselves before the westward march of American civilization, it is important to understand the precise character of those elements. Of all the aboriginal tribes and natives that covered the American continent previous to the European colonization none have commingled with their conquerors, except those who occupied the domain overrun by the Spaniards. With all the others the approach of the European has been the signal for retreat.

A gradual but universal extirpation has been the rule, under which countless thousands have passed away like the mists of the morning. In New Spain, under the peculiar influences of religious proselytism, the natives adapted themselves to the new order of things, and out of this has sprung this nation on our border. It would be vain to expect a higher type of civilization to be the result of such an amalgamation; but it is something to feel that there is an exception to the almost general rule of annihilation which has resulted from the contact of the white man with the Indian. Whether amalgamation could have taken place with any other European nation except the Spaniards,

or if such had been possible, a more elevated race than the Mexican would have been the result, it is difficult to say. Unfortunately, the contrast between the forms of civilization that are now presented on our frontier is almost as great as that which exists between the Caucasian and the aboriginal Indian. Unfortunately, also, the particular type of the Caucasian that we offer on our border, as a contrast to the mixture of races that obtains in Mexico, is not of that high order that would excite envy or admiration; and while we analyze the genealogy of our neighbor, it is well to understand what are the social elements we oppose to his crude and ill-defined condition.

The American residents on the Rio Grande are different in many respects from the great body of the Texas population. The rich lands of that large and productive State have drawn to it a highly industrious and superior class of citizens, under whose influence Texas has become the Empire State of the Southwest, and by whose enterprise and industry the splendid resources of that State are being developed with wonderful rapidity. But the country between the Nueces and Rio Grande is entirely different from the rest of the State. The whole region may be regarded as a rainless district, unwatered by any stream or river; and it ranks with other rainless districts in the world. The stunted vegetation will support a few cattle and sheep, but can never be cultivated—never be populated. In fact, the whole easterly side of the Rio Grande seems to have been abandoned by the rain and flood, and left isolated in its bleak desolation. The few herds of cattle that are scattered over it are at the mercy of the Indians and the equally lawless freebooters from the Mexican side, that find it much easier to help themselves

to what they can steal from the opposite shore of the too convenient river than to have the trouble and responsibility of providing for themselves. Under such circumstances it is not to be expected that a very superior class of population would be found on the border.

To appreciate more thoroughly the average American citizen that is found in that region we must recall the state of things that existed before the annexation of Texas, and when the Mississippi River was the frontier of American civilization. Beyond the boundaries of that vast stream, that bears in its channel the drainage of half a continent, the then unknown West extended in boundless expanse toward the setting sun—unexplored and uninhabited, except by savage tribes. It was a real *terra incognita*, whose vast solitudes the most daring shrank from disturbing. At that time the towns along that river became the resort of all those restless spirits that sought, in the freedom of frontier life, a relief from the (to them) irksome customs and moral restraints of a well-organized society, and found a fruitful field for reckless adventures among the somewhat lawless communities of Vicksburg, Natchez, and other river towns. "Natchez under the hill"—as it was called in contradistinction to the more respectable portion of the town that was built upon the bluff—was a terror to all respectable people, and at night no man's life was particularly safe in that locality.

Gamblers, thieves, murderers, and outlaws of every nationality, found there a congenial habitat, and ruled the hour in unbridled license.

The revolution in Texas, and the subsequent war with Mexico, resulting in the extension of our frontier to the Rio Grande, changed all this, and "the border ruffian"

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took up his line of march toward the farther West. Civilization crowded him too closely, and he yielded to the pressure. At the present moment this particular species of the *genus homo* stands out in bold relief as the defender of an outraged flag and insulted nationality on the banks of the muddy and capricious river, which we are now discussing.

The state of society, which is the result of the mingling of the elements that have thus been described, is of course peculiar in itself, and such as can be found nowhere else in the world; resembling, however, in many respects, the old times on the borders between Scotland and England, where cattle raids and personal feuds formed the chief occupation on both sides the line.

Law and order are terms not particularly well understood along the Rio Grande. Power and force emanating from the military authorities, maintain a certain degree of conservation, but it is a difficult matter for any one to feel absolutely safe at any time. There is something in the atmosphere that teaches one to feel that the tenor of this life is a very uncertain one, whether he is an American or a Mexican. An open enemy, or a treacherous friend, may confront him at any moment, and for this reason no one allows himself to go unarmed. The rifle, the pistol, or the knife, finds murderous employment in the hands of some reckless persons almost any day in the week, and a life insurance company, even with an honest president, would find it difficult to keep afloat in this region. Public and private morality are at a large discount. Nevertheless there are found in every one of the towns along the river many men of character and intelligence, merchants of probity, enterprise and excellent commercial standing. In fact, there is here a very good field for the exercise of business

talent, and not a few individuals have accumulated a competency in the regular course of their legitimate business, while it cannot be denied that illicit traffic has also flourished most successfully.

Even among those who are apparently the most reckless in regard to their personal conduct, there are men of high-toned, chivalrous natures, that would scorn a mean action; but it would require a large amount of the leaven of righteousness to leaven the lump of iniquity that is to be found in the heterogeneous mass of humanity here thrown together, and it is sad to say that this leaven of righteousness will never be found in the depraved and degenerate priesthood that maintain a semblance of religion and exercise a sort of superstitious control over the mass of native Mexicans.

These Padres, as they are called, have fallen away from the faith of the fathers, and their isolation for so long a period of time in this remote region has induced an utter disregard for those moral and religious obligations without which they are a curse to any community, either of saints or sinners.

As the true character of a people is shown more in their daily avocations and customs than by their political status, which is too often falsely represented, we propose to examine more in detail the state of society as exhibited along the Rio Grande, in the large towns, the hamlets and the ranches, and the modes of life which prevail among the different classes. This long frontier of 1,000 miles presents many phases of existence, all of them novel in the extreme when compared to a more advanced civilization.

The boundary, as described by the modified treaty of December 30th, 1853, is as follows: "Beginning in the Gulf

of Mexico three leagues from land, opposite the mouth of the Rio Grande, as provided in Article V. of the treaty of Guadaloupe Hidalgo; thence, as defined in the said article, up the middle of that river to the point where the parallel of 31 deg. 47 min. north latitude crosses the same; thence due west 100 miles; thence south to the parallel of 31 deg. 20 min. north latitude; thence along the said parallel of 31 deg. 20 min. to the 111th meridian of longitude west from Greenwich; thence in a straight line to a point on the Colorado river, 28 miles below the junction of the Gila and Colorado rivers; thence up the middle of the said Colorado river until it intersects the present line between the United States and Mexico."

The parallel of 31 deg. 47 min. north latitude intersects the Rio Grande at the town of El Paso; so that the Rio Grande frontier extends from El Paso, on the north, to the mouth of the river on the south. In taking our survey of the boundary and the people that are found there, we will begin at the mouth of the river, the initial point named in the treaty.

Commercial intercourse with the Rio Grande is almost entirely carried on by the way of the Gulf of Mexico. The few roads that connect the interior of Texas with the towns on the river are little more than trails, infrequently travelled, and never without danger. The traveller, if alone, runs the risk of being scalped by the Indians. If he has companions, and they are Mexicans, he is very likely to be murdered in his sleep by that treacherous race. Railways are gradually making their way from the north and east into the interior of Texas, and one is now completed to the Rio Grande, but the bulk of the trade will, for many years to come, be carried on by the way of the Gulf. The

coast for nearly its entire length is fringed by a succession of lagoons that are separated from the Gulf by long, narrow sand islands. The intervals between these islands are the entrances to the harbors along the coast. Galveston is the principal one, that city being located on the inner side of the island which forms the harbor.

Eight miles east of the mouth of the Rio Grande is the harbor of Brazos Saint Iago (or Arm of St. James), which, on account of the bar at the mouth of the river, is used as the depot of the Gulf trade with the Rio Grande district.

There are but eight feet of water on the bar at the entrance to the harbor, and therefore only light-draft vessels can be used in this trade. Yet all the troops and stores for General Taylor's army during the Mexican War were landed at this point.

Padre Island, a long, narrow strip of sand, separates the Lagoon de la Madre from the Gulf, while Boco Chica (little mouth), another lagoon, communicates on the south with the Rio Grande only at very high tide, or in times of extreme freshets in the river. These two lagoons form the harbor of Brazos Santiago.

From this point a railroad extends to Brownsville, on the Rio Grande, which, although fifty miles from its mouth by the course of the river, is less than twenty miles by railroad.

Formerly, merchandise intended for towns on the river as far up as Roma was either transferred to stout river steamers of light draft, or carried overland in wagons and carts to Brownsville, and there shipped on steamers, or transported to Matamoras, on the opposite side of the river.

I was very much amused on one occasion to see a

couple of Mexican *muchachos* driving a very slow pair of oxen before a cart, on which was laden a hogshead of ice, sent in sawdust from New Orleans as an article of luxury to a Brownsville restaurant. The thermometer was among the nineties, and these Mexican boys made very frequent stoppages by the way, during which they stretched themselves on their backs underneath the cart, and enjoyed the pleasing sensation of feeling the cool water from the melting ice trickle into their throats.

The ice, of course, was soon dissolved under these circumstances, and it was not surprising that when the load was delivered at the door of the restaurant, a quantity of moist sawdust was all that remained in the cask.

The railway from the Brazos Santiago to Brownsville crosses the famous battle-fields of Palo Alto and Resaca de la Palma, where General Taylor won the first victories of the Mexican War over a force three times greater than his own in numbers. These victories sent a thrill of pride and joy through the heart of the whole American people—even those who were the most bitterly opposed to the war, shared in the immense enthusiasm of the occasion.

It was the glorious beginning of a gallant struggle that demonstrated to the older nations the military capacity as well as the military resources of the United States in a way that had never until that time been exhibited.

Following the annexation of Texas to the United States, a corps of observation had been moved to the east bank of the Rio Grande, under General Taylor. A Mexican force, under General Ampudia, occupied the west bank of the river on the opposite side, at Matamoras, Ampudia, with a flag of truce, had previously met General Taylor in person on the Nueces, and warned him, in grandiloquent lan-

guage, to proceed no further. Finding General Taylor obdurate, he descended from his high horse, and volunteered the additional caution that if he came any further he would find the *rattlesnakes very bad indeed!* As soon as General Taylor arrived on the bank of the Rio Grande, at that point where Brownsville now stands, he caused intrenchments to be thrown up, in anticipation of any hostile movement from the other side.

His force was a very small one compared with the Mexicans, but reinforcements had been ordered to join him by the way of Brazos Santiago, and as soon as his small army was properly intrenched, he proceeded in person to the Brazos to bring forward the reinforcements. During his absence, the Mexicans crossed, under Ampudia, and not only besieged the fortifications, but cut of all communication with Brazos Santiago. When the news of the situation arrived in New Orleans, the people were wild with excitement. Mass-meetings were held in all the Southern cities, volunteers in great numbers were enrolled, large sums of money subscribed, and vessels chartered for the purpose of sending relief to the besieged troops, whom it was thought would be defeated and massacred by the Mexicans, in accordance with their well-known brutality. But General Taylor was by no means idle. Organizing the reinforcements without a moment's delay, he marched from Point Isabel to the relief of the besieged. His way lay across an open plain, where the Mexican army had taken up a position in line of battle, with the confident expectation that by their vastly superior numbers, and, as they also believed, their greater bravery and prowess, they would annihilate "the barbarians of the North."

They could not have selected a spot more favorable to the

Americans, nor could the latter have chosen a better battle-field, if they had been allowed the choice. Their flanks were well protected by natural obstacles, and could not be turned. In fact, the advantages in position were largely in favor of our troops. The dispositions in General Taylor's little army were soon made, and the ball was opened.

Never in their lives were any troops so astonished as the sanguine Mexicans. The light batteries which came to the front, supported by infantry, opened a galling fire of grape and canister that mowed down the Mexicans like a scythe.

The infantry, recruited from the young marksmen of the West, opened with deadly precision, and when the ranks of the enemy wavered under the blow, the gallant May charged down upon them with his irresistible column of dragoons and sabred the cannoniers at their guns—capturing La Vega, the general of artillery, by the collar, as a policeman would catch a thief, and bringing him in as a trophy. The struggle of the Mexicans was brief, but desperate. They could not maintain their ground, and fell back to take up a new position.

The next morning, the 9th of May, 1849, General Taylor found them again disputing his passage a few miles in the rear, at Resaca de la Palma. Here was re-enacted the scene of the day before, with even more signal success.

The Mexicans fled in disorder, and the field was won. Fort Brown, as it was afterward called, was relieved, and the war was formally opened.

Close to the site of "Old Fort Brown" has grown up the flourishing City of Brownsville. It is well laid out, has many fine residences, a large market-house, excellent places of worship, and attractive shops.

The mixture of races, with the mixture of customs and habits, gives a peculiar air to the place, but one sees at a glance which is the dominant race.

The first town on the American side of the river is Brownsville. Between Brownsville and the mouth of the river the stream is so winding in its course that the curves almost touch. The land on either side is level and covered with a dense growth of mezquite. The ground is too high to be irrigated by the river, and the climate too arid to depend with any certainty upon rain for the purpose of agriculture. The vegetation is of a semi-tropical character, and along the margin of the river where there is an overflow there are found reed and canebrake palmetto, the willow and water-plants, but little or no useful vegetation. Opposite Brownsville is the ancient Mexican town of Matamoras, the principal settlement on that side of the river, the seat of an old Spanish Mission, the theatre of hundreds of Mexican revolutions, and the home of contrabandists and desperados of the worst type. The houses are mostly of the Spanish style, generally one story in height with a flat roof; some are two stories high and have a good architectural appearance. All the ceremonies of the Catholic Church are religiously observed, and the influence of the priesthood is very apparent, more especially in the degraded superstition which pervades every household. The walls are covered with plastered images in gaudy colors and the pictures of saints in all imaginable forms of beatitude constitute all the ideas of art which these people possess.

The principal buildings, as a matter of course, are those devoted to ecclesiastical purposes. The doors and windows

are tightly closed during the heat of the day, the thick stone walls keeping the interior comparatively cool.

In the evening all the inhabitants swarm out of doors. Everybody and everything bears a contraband stamp, nothing seems to wear an honest look. The glances you receive in passing are furtive and stealthy. The men are lolling around during the day and spending the greater part of the night in silly amusements, petty gambling and dancing, too lazy almost to breathe, and too knavish to earn an honest living, while the women are always busy, always cheerful, either washing by the riverside or preparing food for their lazy lords.

Among the lower classes this food consists for the most part of cracked corn, which the women break with a stone roller on a flat stone called a *mattat*. The broken corn is mixed with water into a kind of paste and baked like griddle cakes upon a hot flat stone, the fire being built underneath. This, together with some black beans, called *frejoles*, stewed in fat, with an occasional chicken cooked with an abundance of red pepper, or some *carne seca*, or dried beef, constitutes the usual Mexican diet all along the river.

The vagabond American who mingles with the Mexicans, falls naturally into the same habits, and, like the impecunious tramp that he is, accommodates himself to circumstances with an excellent grace. The slavish devotion of the Mexican women to some of these creatures, when they take a fancy to them, is something marvelous, showing the dominant traits of the Indian squaw which they inherit from their ancestors.

About 125 miles above Fort Brown is the military post of Ringgold Barracks. Adjoining it is the Texas town of

Davis, and opposite, about three miles from the river, on the San Juan, a small tributary of the Rio Grande, is Camargo, an old Spanish town and Mission. Between Ringgold Barracks and Fort Brown is a small settlement started by a Scotchman, and called Edinborough. Opposite to it is the Mexican town of Reynosa.

Camargo has the usual stamp of the old Mission towns—a plaza, with the church as the principal building, and a row of little one-story shops on the other side. Here are held the annual fairs, which bring together quite a number of people. Like all other Mexican towns, it is besieged every few years, and captured by a revolutionary party. The battles fought at these times are generally very extraordinary contests. On one of these occasions I witnessed the progress of the sanguinary struggle from beginning to end, having an excellent point of observaton on a neighboring eminence. There was an immense amount of noise, an incessant discharge of firearms, and a good deal of change in position of the opposing forces.

Suddenly there was a cessation of "the din of battle," while two columns of dust, rising in the air and moving in opposite directions, indicated that the combatants had each beaten a hasty retreat, while the number of killed and wounded was singularly small.

Although Camargo has many stone houses in it, the remains of the old Mission, yet most of those recently built are constructed of adobe, or sun-dried bricks. Each brick is about two feet long by one foot wide, and six inches thick. In a climate where there is so little rain, these unburnt bricks make a very good building material, especially as the houses are low, and the thatched roof overhangs

it on all sides; so that even if it does rain the walls of the house cannot receive much of the force of the storm.

The town of Davis, on the American side, which joins the military post of Ringgold Barracks, was founded, so to speak, before the arrival of the government troops. A bright young Kentuckian named Henry Clay Davis, who had evinced a somewhat reckless disregard of local prejudices in his native State, found it advisable or convenient to transfer his citizenship to Texas, and had taken a not inactive part in her troubles before annexation. He found much that was attractive and congenial with his somewhat unrestricted tastes and habits, and he entered with all the ardor of youth into the interesting and exciting events connected with the original unpleasantness between Texas and Mexico, and when the struggle was over he wandered toward the Rio Grande, with no very definite ideas as to what he would do when he arrived there. He was entirely alone, and foot-sore and weary, he came at nightfall to the bank of the river, where he threw himself down under the only tree that was in the neighborhood, and soon fell into a sound sleep.

Awaking in the morning refreshed but hungry, he surveyed the situation, and soon discovered that he was in the immediate neighborhood of an extensive ranche. He lost no time in making the acquaintance of the ranchero with the ultimate object of procuring some breakfast. The story goes that he had dreamed during the night while sleeping on the ground "'neath the sentinel stars" that a lovely maiden appeared to him and told him that he was to be the founder of a city. Be this as it may, while partaking of the breakfast that the hospitable proprietor of the ranche had provided for him, he discovered that his host was the

father of a beautiful daughter, who was his only child. The discovery eventuated in the fair damsel becoming the wife of the gallant Kentuckian. The *pater-familias* departed this life, the City of Davis was founded, and is now an important business centre, with many fine residences and stores.

The solitary tree has been inclosed with a circular stone work and broad seat around it, where the writer has often listened to many thrilling stories of an adventurous life told him by the Hon. H. Clay Davis, State Senator from Starr County, Texas, and founder of the City of Davis. Davis was once invited to dinner on a very warm day, but declined the invitation because it was too warm for him to wear his "senatorial costume," and it would not be polite to go without it. By senatorial costume he meant his coat, which he never wore except in the Senate, his usual dress being simply pantaloons and shirt.

Eight miles above Ringgold Barracks is the town of Roma, built by an Englishman of that name. This is the head of steamboat navigation, and is opposite the town of Mier, situated on the Mexican side, about three miles from the Rio Grande, on the Salado, a small branch of that river. Mier is famous as the place where a terrible tragedy was enacted during the Texas struggle for independence. A party of about two hundred Texans had crossed the Rio Grande to carry "the war into Africa," and attacked the town. They were defeated, and those who were not killed during the engagement were made prisoners. With that refinement of cruelty which a Mexican knows only too well how to exercise, the victors decided to decimate the captives; accordingly, a number of white beans were put in a bag, and a black bean for every ten white beans The prisoners

were then compelled to draw; those who drew a black bean were to be shot, their companions being compelled to look on while the butchery was being enacted. The survivors were then chained together and taken to the City of Mexico, where they were put to work on the streets. Some of them were confined in the Castle of Perote, from which they subsequently escaped, and after many hardships arrived at their former homes.

Several of these men afterwards accompanied the American army to the scene of their sad trials; and the writer heard from one of them, in the Castle of Perote, the account of their imprisonment and escape, pointing out the embrasure through which they squeezed their bodies, after dieting almost to starvation to reduce themselves in size, that they might get through the narrow opening, scarcely large enough to admit the body of a child. One poor fellow squeezed through with loss of so much of his skin, that he did not survive the shock.

The next town above Roma is Laredo, on the American side. Laredo is one of the old Spanish Missions of Texas, quaint in its architecture, gloomy and time-stained. Here resided in former times the opulent owners of countless herds of cattle and horses, that roamed over the broad praries, living on the wild grasses, and adding each year a large increase to their numbers. But the terrible foe of civilization and destroyer of all industries, the brutal savages of the upper plains, and *mesas* of the North, came down upon this flourishing colony, and made havoc with the flocks and herds, and it has been repeated for years and years, with no apparent hope of relief from this periodic curse.

At Laredo there is a military post, called Fort McIntosh,

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which the writer established in 1849, with a battalion of the First Regiment, U. S. Infantry. It is an important point. Here the railroad from San Antonio crosses into Mexico and thence into Saltillo. The great Mexican salt-trail passes also through this place to the Salt Lakes, lying between the Nueces river and Rio Grande. The water in these lakes is so impregnated with salt that when evaporation takes place in mid-Summer, the salt is deposited in a thick layer on the banks, from whence it is gathered in leather sacks, and transported on ox-carts into the interior of Mexico.

Similar deposits of salt near San Elizario, in Northwestern Texas, caused the recent outbreak at that place. This salt has always been regarded as the free gift of heaven, and all could have it for the taking.

Any claim to exclusive ownership, especially if the claim was a doubtful one, would naturally be resisted.

About a hundred miles above Laredo is Eagle Pass, where there is a military post—Fort Duncan. This is also an important point, as there are many Mexicans residing on the opposite side of the river, and a great deal of intercourse across the stream takes place here. From this point there are no towns of any importance this side of El Paso, the initial point of the boundary line. All along the boundary, on both sides of the river, there are occasional ranches, or the ruins of ranches, that have been destroyed by Indians.

The ranchero leads a life midway between a savage and a civilized being. His existence is a purely animal one. His mind is only useful to him as enabling him to excel the lower animal in cunning. Of mental pleasures he knows nothing whatever. Yet the individual Mexican ranchero is

probably the most independent of all human beings, so far as the conventionalities of life and his own personal wants are concerned. He does not absolutely require the services of any other human creature to enable him to carry on all the operations of his ranche, either in the construction of his house, his implements, his furniture, his vehicles, his clothes, or in the preparation of his food.

The social problems of life are solved by him with a readiness that would astonish the philosophers of Brook Farm, or even Fourier himself. To build himself a house, he first marks on the ground a parallelogram, and along the line so marked out he digs a trench about a foot wide and two feet deep. Then, having felled a number of trees of convenient size, he cuts their trunks an equal length, and, stripping off the bark, sets them upright in the trench, which is then refilled with earth. The tops of the posts are lashed together with the aid of long strips of raw hide, that, having been first thoroughly soaked in water, shrinks in drying, so as to hold together firmly anything that is bound with it. Two forked sticks at either side of the inclosure sustain a ridgepole for the roof, and on a network of light poles, fastened also with the strips of raw hide, he works a thatching of long prairie grass, which is impenetrable by the rain. One door and no windows constitutes the sole opening of this house and castle; and several generations are frequently found living for years in just such a habitation. With no other implement than an axe, and with neither hammer nor nails, he makes his carts, hewing the wheels from a solid log, and binding the parts together with strips of raw-hide. His plow is a sharpened stick, with a handle inserted in a hole that has been burned in with a red-hot iron.

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His clothing he makes of the skins of deer; on his feet he wears sandals; his *sombrero*, or hat, he weaves from straw, and sits on a mat of the same. A little cracked corn and some dried beef give him all the food he wants.

Behold the outfit of a first-class ranchero! This is the type of the peasant and largest part of the Mexican population.

Those who live near the larger towns and cities evince a little more care for their personal appearance if they have families.

The buckskin shirt is exchanged for one of white muslin, and the leather pantaloons for those made of cloth. For the outside seam of this garment eyelet-holes are substituted, and these are laced to a point just below the knee; from there they are left open. A crimson sash around the waist, and sometimes a gayly-embroidered jacket, a fancy *sombrero* of black leather with a gilt cord around, make up this gorgeous costume. If he aspires to be a *caballero*, he becomes the possessor of a spirited Mexican pony, with a saddle and huge leather saddle cloth, all elaborately embroidered, as well as the bridle, often with silver and gold ornaments of an elaborate character. To his spurs large rowels are attached, and also little bells. At times he wears a gayly-worked *poncho*, or blanket, with an opening in the centre, through which the head is inserted, while the blanket hangs in equal folds behind and before.

Sometimes the blanket is worn over the shoulder like a Spanish cloak, with an end thrown over the back. The whole dress, to say the least, is extremely picturesque and graceful.

The women present in their costume an equally unique appearance. The poorer classes are not overburdened with

garments. A loose chemise, with a short petticoat and no stockings, constitute the entire wardrobe of a Mexican peasant woman. For cool weather a *rebosa*, a kind of long shawl, which they weave themselves, serves to keep them warm. This is thrown gracefully over their shoulders, or worn with equal grace over the head and then around the shoulders.

The higher classes wear a profusion of stiffly-starched skirts, and a richly embroidered or lace shawl, with a high backed comb confining their hair. The peasant women wear their hair in a simple braid down the back.

The interior arrangements of the ranchero's dwelling are of the simplest description, invariably consisting of one room for all the members of the family. The beds are hides stretched on rude frames, with pillows stuffed with cotton, always very small in size. The children, to whom garment, like discretion, come only with age, lie around at night on hides strewn over the floor. Dogs, pigs and poultry have the full range of the premises, while the favorite place to look for eggs is under the bed, where the hens prefer to lay them.

Of course there is much refinement, intelligence and elegance in the large cities, especially among the pure Castilian families; but I have pictured nine-tenths of the inhabitants of Mexico in the foregoing description.

And this is the kind of civilization that has been face to face with us for thirty years without the slightest visible change having taken place in these truly unfortunate people. I say unfortunate, because they are more degraded, as a people, than any other nation on the face of the earth that claims to be civilized. There are three causes at work to maintain his degraded status: Internally, a depraved and degenerate priesthood, and a horde of unscrupulous

partisans who seek and obtain power by brute force, and retain it solely for the public plunder they are enabled to secure. Externally, the unsubdued Indian tribes that harrass the border, cripple and destroy their industry, appropriate their substance and murder or enslave the men, women and children indiscriminately.

For thirty years we have failed to make the slightest impression, with all our boasted civilization, on this extraordinary race of people. For thirty years we have been brought together in daily intercourse along the border, while a difference of at least three centuries in all the habits and customs of life has maintained itself on the opposite side of a narrow river, with the same tenacity that would seem to be possible only on the two sides of an impassable gulf.

Thirty years on one side of this border have seen the rise of populous cities from mere hamlets—have seen the construction of public works throughout the whole United States, to an extent unparalleled in the past history of the world; have seen the whole land dotted with splendid and costly edifices dedicated to learning, to charity and to religion. One century of civilization has made 40,000,000 of people prosperous, happy and free, on one side of the border, while three centuries of a bastard civilization have only served to plunge the people on the other side into a deeper slough of degradation.

Is it not barely possible that the American people, as a people, or the American Government, as a Government, have failed in the discharge of a manifest duty to this people and to themselves, in tacitly suffering such a state of affairs to exist? Have we not allowed a blighting influence to demoralize and almost destroy, for all available purposes, a large extent of territory over which the Ameri-

can flag waves apparently by sufferance? In short, have we gone to the root of the evil in our treatment of the international questions that have presented themselves between the United States and Mexico?

From time immemorial, certain bands of savages, having their habitat in portions of Northern Mexico and Texas, have existed solely by the plunder of the more peaceful of their own race and the new races that have come within the range of their predatory warfare.

Taking advantage of favorable seasons, and choosing generally the full of the moon for the facilities afforded by its light, they have maintained, unchecked for generations, a systematic mode of rapine and murder that has existed nowhere else on this continent. These marauders move in bands of from twenty to a hundred. They are not necessarily of one tribe of Indians; frequently a number of tribes are represented in the same band.

The principal object is to obtain horses, and while doing so to satiate themselves in the indulgence of all their most brutal instincts.

With little or no clothing to cover their nakedness, mounted on half-starved ponies, with no saddles except, perhaps, a small pad of sheepskin, filthy and odorous to the last degree in their persons, revolting in appearance, greedy, sensual and cunning, they start out on their expeditions as the wolf leaves his lair, in search of prey; yet their tactics are vastly superior to those of the troops sent against them. As they move over the country, scouts are sent to the front, and to the right and left, to give warning of danger. A few dried leaves, gathered together and ignited on some elevated point, tell all they want to know.

Cabalistic signs on trees or on the ground are readily understood and interpreted by them; and several distinct

bands, moving in different directions, are enabled by these signs to impart information to each other. Their trails are a network of intricate windings that none but themselves or those well versed in Indian ways can understand. Rushing through the country when pursued, without stopping day or night, either to eat or to sleep, driving before them a herd of animals which they mount when those they are riding give out; halting only for a moment to kill their broken-down animals and cut pieces of flesh from them, which they eat raw as they ride on; or if they have no spare animals, killing a deer, or even a polecat, still riding furiously on—what wonder that a lot of awkward, raw recruits are so seldom able to overtake them, and when they do, so often find themselves over-matched?

No one seems ever to have suggested the idea that an Indian is the best one to hunt an Indian, as a thief is sent to catch a thief. What is better yet, but has never been practiced, is to give intelligent white men the Indian training that is necessary for such warfare.

Skilled marksmen, with a dress of buckskin, habituated each man to care for himself, yet to act in concert; men whose tastes and inclination would lead them to perfect themselves in wood-lore and forest life; who would learn to live on roots and game, as the Indians do; who had the courage to hunt them in their lairs, and the stamina to sustain them in all emergencies—these are they who should do this work, and who would do it well and thoroughly. No need of Modoc slaughters or Custer massacres; no need of wasting millions for trifling results. A little common sense, a little bull-dog tenacity, would solve this Indian problem in as many months as there have years been wasted in pursuing other methods.

But there is another element that has within the last few

years grown up into considerable magnitude on the frontier, that requires equal but different consideration. The border raids of cattle-thieves are distinct from the raids of the Indians, although there are more or less of both these elements combined in the frontier disturbance.

Mexico has been for many years educating a class of vagabonds into hordes of desperadoes and thieving cut-throats, that constitute the chief element of the thousand and one revolutions that are gotten up so readily at a moment's notice in that delectable land of pronunciamentos.

These lazzaroni are the result of the infamous system of human slavery that obtains throughout that country under the name of *peonage*. A *peon* is a poor devil who is supposed to have gotten himself into debt for food and clothes to some one or other of the land or mine-owners of the country. The law compels him to work out this debt, or in other words, he is held to service until his master chooses to release him, which he seldom, if ever, does. In the meanwhile he is simply a slave—nothing more, nothing less; and Mexico is a slave country—nothing more, nothing less; The *peon*, who sees nothing before him but a life of slavery, is converted into a thieving vagabond, and these wretches constitute three-fourths of a population of which nine-tenths have Indian blood.

These *peons*, when they desert their masters, are fugitives and outlaws, and the frontier is their happy hunting-ground.

Such as these are our border neighbors, on whom is to be exercised all the comity of nations, and the abstruse principles of international law. These are the cattle-thieves who are not to be pursued across an apology for a river, because it is a nominal boundary, and offense might be given to a friendly nation and a sister republic. Yet our

own citizens whose property has been stolen or destroyed, whose homes have been pillaged, whose relatives have been murdered, require and demand that protection which is their right. How are they to receive it? How is it to be furnished to them? These are the questions that are now to be answered. Years of procrastination and neglect have culminated in a condition of things that admits of no further delay in the application of the needful remedies. A careful study of the situation as it is, an examination of the physical characteristics of the territory under consideration, cannot fail to convince any intelligent person that the difficulty all lies in the original error of adopting a purely hypothetical boundary, about which little or nothing was known, and in attempting to establish in a desert country a cordon of military posts, whose strength and resources are scarcely sufficient to enable them to maintain their own existence, to say nothing of protecting a thousand miles of frontier against innumerable bands of hostile savages, or hordes of thieving vagabonds, who are no better and sometimes worse than the pure Indian. The question is, how to remedy this error and the evils that have grown out of it. There is but one way possible, and that is to re-adjust the boundary. To maintain a chain of posts along the Rio Grande for the purpose of restraining Indian incursions is a huge farce that has been kept up for thirty-five years with the most ridiculous results.

All experience has shown that to handle the Indian properly and successfully, we must go to his home, not wait for him to come to ours, with all his preparations made for combat, while we are totally unprepared. If troops are to be used, let them be placed where they can do the most good. If a cordon of posts is established, let it be on a line running east and west, not north and south. The Indian

haunts are in the State of Chihuahua, Northern Mexico, and on the staked plains of Northern Texas. The cordon should be established so as to keep them there, and from thence good fighting men, not green recruits, should be sent to bring under complete subjection these irreconcilable foes of civilization.

Of course this involves the necessity of such a readjustment of our present boundary as will enable us to accomplish successfully the protection of our citizens for all time against the ravages of these lawless tribes. At the same time Mexico will be at last relieved from the terrible external pressure of barbarism which has been the chief bane of her existence. Free then to look to the improvement of her internal condition, she can perfect measures of reform that will bring a further relief from false creeds and false leaders.

An adjusted boundary that should have for its north and south line the easterly crest of the Sierra Madre, and for an east and west line the parallel of 29 deg., would give us entire control of the nomadic tribes of Apaches, Comanches, Lipans, Kioways, and all the lesser tribes that infest Sonora, Chihuahua, Arizona, and New Mexico; will bring to active development a large territory now overrun by these brutal miscreants, and utterly worthless, except for their mineral resources, which can never be developed in the present condition of things, and which will be as useless to Mexico for the next 300 years as it has been for the past 300 years. Mexico will lose nothing and gain much, while civilization will also gain much and lose nothing. At any rate, the question is now to be met, and if those who have the responsibility fail to realize the necessities that exist, and the opportunity that is offered, they will be able to render but a poor account of their stewardship.

THE NEW GERMANY.

BY

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The third quarter of the nineteenth century will certainly rank as one of the most important periods in human history. Never in so short a time have so many great historical developments been accomplished in so many nations. The British Empire, from one end to the other, has been almost transformed in its administration and spirit. In France a despotism erected by fraud reached its culmination, declined, and collapsed in such manner as to teach a tremendous lesson to the nation and to the world. Italy, which was, at the beginning of that brief epoch, oppressed by domestic and humiliated by foreign despots, has gone through several phases of thought and action intensely interesting, and has come forth a united nation; from "a mere geographical expression," as Metternich called her, she has become a European power. In Russia forty millions of serfs have been transformed into free farmers.* In our own country slavery has been abolished, the weight of influence in the nation transferred from a part to the whole, and civilization quickened and strengthened as never before.

But perhaps the country which shows the most striking development is Germany. At the beginning of the period she was distracted between two great powers, each thwarting the other in every effort for national unity, both play-

* Wallace, "Russia," Vol. II., p. 295, note.

ing for evil upon a multitude of smaller powers whose petty ambitions increased the general confusion; neither able to withstand the interference of France on the one hand, or of Russia on the other. But now, by an amazing series of events, she has taken her place among the great powers of the world—indeed, among the great results of the world's history.

This majestic entrance is the result of no mere happy accident, the bold stroke of a despot, the chance whim of a mob; it has come of long-continued sacrifice, and work, and struggle. Germany has gained this glory, not merely by victory over other powers, but, far more, by victory over herself—over tendencies to sloth, anarchy, unreason, self-indulgence. All this bloom of German military genius and statesmanship and diplomacy is grand and noble because it has been developed out of a sound national character by heroic effort.

Indeed, the central fact in this growth of modern German civilization is just this: the struggle of strong hearts and minds and souls with difficulties and dangers. Other nations have had, indeed, to fight their way to greatness; but the struggle of Germany has been by far the longest and most trying. Her difficulties and dangers have resulted from her place in European geography and her part in European history; and these dangers have been not only material and military, but moral, intellectual, and social. There is, it seems to me, a perfect analogy between a strong, sound man building up his whole higher nature in struggling with obstacles and dangers, and Germany building herself up in that long conflict which has been her main work for ages, and which is her main work to-day.

In a single lecture I can, of course, touch but a small

part of so vast a subject. I can only bring forth from it a few things which most clearly show how Germany has become what she is, how she purposes to maintain herself in her present position, and how our own nation may profit by her example.

Look now, for a moment, at the difficulties which have environed her. Take first her *geographical* position. Military dangers are seen in its every feature. She lies in the midst of Europe, with hardly any natural boundaries. Nations hostile to her in race, religion and politics have always pressed her on every side: Scandinavians on the north; Slavs on the East; Turks at first, and Magyars afterward, on the southeast; Romanic nations upon the south and west; and, at the northwest, nations kindred in race but estranged by ages of hostile interests, hardened by struggles with the sea, and ready at any moment to cripple her commerce.

Note next her *political* difficulties. The same central position which has laid her open to foreign military effort has laid her open to foreign political effort. Out of the north have come upon her the policies of Gustavus Adolphus and Charles the Twelfth; out of the east, the policy of the Russian Czars from Peter the Great to Nicholas; out of the west, the policy of the whole series of French statesmen, Francis I., Henry IV., Richelieu, Louvois, Louis XIV., Napoleon.

Glance for a moment over the difficulties in her *intellectual* development. At the decline of the empire she possessed the best elements of a new European civilization: Teutonic independence, the imperial and municipal traditions of Rome, the ideas and organization of the Christian Church. Out of these elements were developed German

mediæval civilization—rich, varied and powerful. And from its midst towered great thoughts of great thinkers.

But out of struggles brought on by a geographical necessity, real or supposed, came anarchy, and out of anarchy, sterility; the necessities of a "Holy Roman Empire" checked the evolution of German nationality.*

Yet, in spite of this, Germany entered into the modern period grandly indeed. She gave to the world the printing press just in time to serve the Renaissance and the Reformation. But her geographical position invited foreign interference and anarchy of a new type, not only in her politics, but in her whole life and thought. German literature and art came to be mainly overlaid with a crust of French frivolity. The extinct volcano was overgrown with weeds. Long after the other nations of Europe had developed a modern literature, she had none.

Note next the more evident difficulties of her *moral* development. In the seventeenth and eighteenth centuries nearly every one of her myriad petty rulers was fashioned in the likeness of Louis XIV. and Louis XV. Each prince, whether ecclesiastical or secular, must have court, palaces, lackeys, mistresses, after the manner of Versailles. At this hour the influences of that wretched period, while they have been banished from modern German art by generations of earnest effort, constitute a fossilized stratum in the architecture of all her older cities. Take, as a type of one of these social fossils, the cathedral of Würzburg, once the capital city of a Prince-Bishop. The eye is caught first by the majestic twin towers of the cathedral—one of those monuments of the pre-Gothic period more imposing in

* Among the more accessible authorities see Bryce, "Holy Roman Empire," pp. 211, 212. Also Giesebrecht and F. von Raumer, *passim*.

many respects than anything produced in the bloom of mediæval art. The edifice is vast and reared in solid stone, with arches bold and single-centred. As you approach, its greatness overawes you. As you enter, all is changed; for the interior vaulting has been overlaid with glaring stucco; semi-nude figures in staring plaster sprawl over its ceilings; in the very sanctuary, where the Middle Ages accumulated the masterpieces of stone-carver and wood-carver and iron-worker, all has been debased. All those works of art inspired by piety have been cast out, and in their place you have a rococo saloon, painted in white and gold—meaningless in form, vapid in color—meretricious from first to last. Thus it was that the Prince-Bishops of the time of Louis XV. stamped their ideas of religion upon the life of their time.

You take flight from the cathedral to the Bishop's palace. You are amazed to find it richer in many respects than Versailles. The staircase leading to the Prince-Bishop's apartments is more sumptuous than any in any French palace. But all is debased. Of that which gives dignity to Christian art, there is not a trace. And Würzburg is typical. Wilhelmina of Baireuth, Pöllnitz, and their compeers, in their accounts of visits to these petty courts, show us that during the eighteenth century the highest effort of almost every one was to ape French despotism—and to ape its vileness, rather than its refinement.

From a race of princes thus educated were generated such rulers as those of Hesse and Brunswick, who sold their subjects to Great Britain that she might crush the liberties of our fathers. Then was developed in Germany a civilization which built up in each province a governmental pyramid, with a people of starving slaves around

its base, with soldiers, courtiers, priests, and mistresses as its fabric, and with an enervated despot as its capstone.*

And in our own century vast immoral forces have been set in motion from the outside. The fearful reaction after 1815 seemed, indeed, to centre in Metternich; but Metternich, after all, was a petty personage compared with the Romanoff on one side of Europe and the Bourbon on the other. Recall for a moment the reaction after 1830, with Nicholas of Russia at its head. Every little German capital became the theatre of Russian intrigue—worse than French intrigue, because representing mere brute force. Was any great God's-truth to be crucified in any part of Europe, Nicholas led the crowd who passed by reviling and wagging their heads. Was any petty despot's lie to be baptized, Nicholas stood its godfather. Go to any of the residences of these petty princes to-day, and you shall see some of his vases or columns in malachite, or *lapis lazuli*, or porphyry, or porcelain—the outward and visible signs of that inward political corruption. With the children of the German princes his children intermarried; but no connection of blood or marriage hindered him from inflicting any humiliation demanded by the interests of despotism. The humiliation of Prussia at Olmütz by the fiat of a Russian autocrat is absolutely the worst political degradation to which any great nation has

* Excellent pictures of this period are most accessible in the historical works of W. Menzel, Biedermann, Riehl, Friedrich Kapp, and especially in the illustrations of Adolph Menzel; for a very entertaining study of the direct influence of France on Germany, see Honegger "Kritische Geschichte der Französischen Cultureinflusse in den letzten Jahrhunderten." For masterly but brief discussions, see Julian Schmidt, "Geschichte des Geistigen Lebens in Deutschland," Vol. I., Introduction. Also H. von Treitschke, "Deutsche Geschichte im XIX. Jahrhundert," First Part.

been submitted in this century. At the grand entrance of the palace at Berlin stand two statues of strong men curbing spirited horses. Nicholas presented them to the King of Prussia when the influence of Russia was at the highest. The Berlin populace, by a sure instinct, christened one "Progress checked," and the other "Retrogression encouraged." This influence it was that separated the thinking of German rulers from the healthy political development of their peoples. This it was that reduced to nullity one of the most gifted kings in this century or any other—Frederick William IV. of Prussia. To stand against this Russian interference, was to risk social ostracism. The present Emperor and Empress, then Crown Prince and Crown Princess of Prussia, dared show a preference for English constitutional policy over the methods of the Russian autocracy, and they were harassed by a crowd of lackeys.*

The same spirit of interference with German ideas descended from Nicholas to his son Alexander II. One of the most kindly, liberal and patriotic of men, he inherited his father's modes of dealing with Germany.

Pardon here a personal reminiscence: In the year 1855, a youth just out of college, I was attached as under-secretary to the American Legation at St. Petersburg; and it was in that capacity that I witnessed a scene which impressed that relation between Russia and Germany upon me forever. It was on the day after the death of the Emperor Nicholas. The diplomatic corps had assembled in the Winter Palace at St. Petersburg to pay their last homage to the dead and their first homage to the living

* For very curious revelations of this see the memoirs of Lady Bloomfield, recently published.

Emperor. The Crimean war was dragging on, and the humiliation of Russia was already foreshadowed. Alexander II. was ushered into the midst of the diplomatic body by Nesselrode, and in his speech, though unable at times to repress tears at the death of his father and the condition of his empire, he did not forget his inherited relation to Germany. Turning to the Austrian Ambassador, he addressed him much as an offended schoolmaster would reprimand a disobedient schoolboy; hinted at Austrian ingratitude for Russian aid in suppressing the insurrection of Hungary; hinted at her falseness to the Holy Alliance; all with the tone of one accustomed to give orders to Austria and have them obeyed. And then, turning to the Prussian Ambassador, he spoke much as the same schoolmaster would have spoken to a schoolboy obedient and docile. Naturally the whole result of such interference as this was, from a political point of view, profoundly immoral. In an atmosphere thus contaminated civic virtues could only grow like roses in a dungeon.

Closely connected with all this series of difficulties arising out of her *geographical* position, was a long series of internal struggles, more or less complicated with external, arising out of her *historical* development.

The first of these naturally arose out of the relations between the earlier German rulers and the Roman See. These having been surmounted after ages of strife, Germany in spite of anarchic tendencies grew in great majesty.

Then came another series arising directly from the Reformation. These having been overcome, and right reason having gained sway at the peace of Passau in 1552, there was given a brief period for peaceful work.

Then came the third and worst series of all—the Thirty

Years' War. At the treaty of Westphalia, which closed it in 1648, the whole material and moral basis of society seemed swept away. It is a simple historical fact that in many districts the population was absolutely blotted out. In some the population and wealth have only within the past ten years reached a point at which they stood in 1618. Great cities were reduced to petty villages. I remember that, in passing the Wetterau district, near Frankfort-on-the-Main, I stood upon a knoll which commanded a wide view in all directions. Not a village was to be seen; and yet maps made in the early part of the seventeenth century show not less than twenty villages within sight of the spot on which I stood. The whole people became barbarized. Robbery, murder, pillage, prevailed in their wildest forms, and the torture of the peasantry was a favorite sport of the soldiery. The same crimes in even worse forms were committed by the rulers. The debasing of the currency changed all business into gambling, and rooted out the last trace of public morality. Schiller has shown us how the simplest belief in the existence of a God was banished from the minds of vast numbers of the German people.*

Not less striking was the *intellectual* decline. That healthy morning glow of German literature at the beginning of the seventeenth century, which seemed to betoken a full orb about to rise above the horizon, was followed by gloom. There came a literature made up of bigotry and pedantry,—universities in which the instructors became

* See Schiller, Hillebrand, Henne-am-Rhyn, Riehl and, above all, the "Adventures of Simplicissimus." For a curious local survival of the old sectarian hostility which produced the Thirty Years' War see Julius Rodenberg "In Deutschen Landen," chapter on Bamberg. It appears that in that city, even now, Catholics and Protestants cannot buy and sell with each other.

more and more stupid and the students more and more imbruted.* And in this darkness we see developed such leaders as Carpzov, whose boast was that he took the sacrament every Sunday of his life, that he had read his Bible through fifty times, and that he had sent thousands on thousands for petty crimes or for no crimes at all—especially for witchcraft—to the torture chamber and the scaffold.† It was the golden age of bigots and pedants. At this period came leaders in the Church occupied mainly with questions of dogma, leaders in the State occupied mainly with questions of plunder, and both classes eager to create petty strongholds for despotism. This was the golden age of witchcraft persecution. Out of it stares the fearful fact that for this imaginary crime there were put to death, in Germany alone, between the middle of the sixteenth century and the middle of the seventeenth, over one hundred thousand innocent persons.‡ This, too, was the period when Church and State combined to keep up that most cruel and most demoralizing feature in the history of jurisprudence—procedure by torture; and a torture worse by far in Christian Germany than it had ever been in Pagan Greece and Rome.§

Not less striking, too, was the *political* decline. From an empire, with traditions of a central authority, Germany became a mere combination of petty despots, each inde-

* See account of Pennalism and other monstrosities in the Universities in Carl Schmidt's "Geschichte der Pädagogik," also in Von Raumer.

† See Wächter, "Beiträge zur Geschichte der Deutschen Strafrecht;" also Eichhorn, "Staats- und Rechtsgeschichte," and Mittermaier's "Handbuch."

‡ See Scherr, "Geschichte der Deutschen Frauenwelt," II, 167; Soldan, "Geschichte der Hexenprozesse," last ed.; Horst, "Zauber-Bibliothek," &c., &c., &c.

§ Note the simple comparative statements made by any authority, as in Schömann's "Attische Prozess," Wächter's "Beiträge," Feuerbach, Du Boys, Thonissen, *et al.*

pendent in his own domains, large or small. In politics, the whim of the ruler was the law of his people; in religion prevailed the dictum *cujus est regio, ejus est religio.* Both churches, Catholic and Protestant, vied with each other in making Scripture support despotism; but it must be confessed that German Lutheranism outstripped in this respect the mother church. This political disintegration made Germany an easy prey for foreign nations. Louis XIV. found it easy to bribe most of these princelings against each other and against their country. Louis XV. imitated his predecessor; and Napoleon played the same game on a still greater scale, until, in the first quarter of this century, the whole German nation became the sport of the French Cæsar,—Jerome Bonaparte, *le roi loustic*, playing his farce of a court at Cassel, with the chorus of "*Morgen wieder lustig, Messieurs,*"—Bourrienne first and Davoust afterwards playing their tragedy of a government at Hamburg, with echoes coming up from the murders of Palm at Nüremberg and Hofer at Mantua, and with Haugwitz mixing tragedy and farce at Berlin and Vienna.*

And, finally, this historical development was fatal to *Art.* Up to the beginning of the seventeenth century, the rising glories of art had begun to light every part of Germany. There had been an accumulation of wealth which greatly favored this development. Not only wealthy individuals, but wealthy cities, took pride in rearing great artists and in hoarding their works. Art flourished in every branch, and penetrated deeply into every industry. The sacrament-house and the shrine of St. Sebald at Nüremberg, the chor-

* See Sybel "Essays;" also Tellkampf "Die Franzosen in Deutschland," especially the extracts from Häusser, Perthes and Droysen. But most eloquent of all—Lanfrey "Histoire de Napoléon," Vol. III., Chap. IX.

ister's seats at Ulm, the well-curb at Ratisbon, the rood-lofts at Lübeck, the ecclesiastical vessels and ornaments of Hildesheim, the goldsmith's work of Lüneburg, the carved house-fronts of Brunswick, thousands on thousands of relics in every city and town, show how deeply this feeling for art was rooted in the life of the nation. The works of Dürer, of Holbein, of Peter Vischer, are but examples of the bloom of this growth. By the Thirty Years' War all this was blighted—not to be seen again in any of that native strength until nearly two centuries afterward.*

The first development of a higher condition out of a lower by a long period of struggle both in thought and work, is seen in the *material progress* of the nation. The fearful ruin wrought by the Thirty Years' War, by the wars of Louis XIV. and Louis XV. and Frederick the Great and Napoleon, the systematic plundering of the people by those petty princes who imitated French monarchs in the last century, and the demands of vast standing armies in this century, have weighed heavily upon German economic progress. Hardly less heavy has been the weight of that stupid, solemn conservatism in government, which held general sway up to a time easily within our memories.

This stupidity it was which protected the industry of every petty province against that of every other; which fought off the development of a railway system; which drove Francis Lieber, one of the greatest among modern publicists, to America, and kept him here†; which drove

* Out of the multitude of works revealing this early wealth and following decline of German art, see Lübke, especially his "Renaissance." Merely to turn over its illustrations gives one a new sense of that early German fertility.

† See Perry's "Life and Writings of Francis Lieber," New York, 1883.

Friedrich List, one of the greatest of modern economists, to Switzerland, and finally to suicide.*

But earnest men thought and studied and labored on, political prejudices were gradually overcome and a vast incubus of trade restrictions thrown off. Canals, railways, harbors, public improvements of every sort, have been developed. Manufactures have been built up, some of them, like that of Krupp at Essen, titanic. Great lines of steamers from Bremen, Hamburg and Stettin show that it is possible to revive commerce, even with Great Britain as a rival.

There is, indeed, in much of the ordinary German trade, a certain narrowness and pettiness in dealing, a timidity in taking advantage of the large streams of commerce, very curious to one acquainted with American affairs. It will seem strange to you to hear, as it once seemed strange to me to learn from long experience, that the ordinary conduct of trade in German towns is much less honorable, or even honest, than in American towns of the same class. More than once I have heard American citizens of German birth confess this. Americans engaged in trade will, perhaps, require a larger margin of profit; but, this being understood, there is far less of petty scoundrelism than in corresponding circles in German towns.

This does not arise from want of popular honesty. German peoples have been in all times honest peoples. It comes, I am persuaded, from the fact that the historical development of the trading class has prevented its becoming so self-respecting a class there as here. But it must be

* See Staub, "Friedrich List," Munich, 1879, and "Friedrich List ein Vorlaufer und ein Opfer für das Vaterland," Stuttgart, *n. d.*

said that in this, as in other respects, the German advance is steady, sound and healthy.

Out of many things in this industrial development worthy of note, I will select just one as suggestive of practical thought in our own country. This is the building up of material interests by technical schools, industrial museums, and provincial exhibitions.

The *Polytechnic Schools* are among the glories of every leading city. At Munich, Stuttgart, Carlsruhe, Aix-la-Chapelle, Dresden, Hanover, and many others, these institutions are lodged in edifices which rank among the architectural triumphs of the nineteenth century. The polytechnic school at Berlin has a building more imposing than any palace in Germany; and the *personnel* and equipment are worthy of it. From these are graduated, year after year, men who are to become captains in the great army of modern industry—civil, mechanical, and mining engineers, architects, builders, manufacturers.

Closely allied with these are the *museums of industrial art.* At Nüremberg, Frankfort, Munich, Stuttgart, Berlin, Dresden, and many other cities, such museums have been erected at great cost and in great beauty. In them are collected, from every country, specimens of the most perfect work into which art enters. No price is too high for any specimen likely to stimulate or improve German art industry. The Prussian government paid not long since for a small collection of goldsmith's work—beakers, cups, and the like—from the old town of Lüneburg, a sum equal to two hundred thousand dollars of our money; and this simply to aid in the elevation of that one branch of industry. Everything which can school artists in beauty of form or color or proportion, whether ancient or modern, is

gathered at any sacrifice. In this Germany shows a largeness of view which puts America to shame.

Closely connected with these are the *provincial expositions.* Not a year goes by that one does not find, in some two or three towns of Germany, a local exposition of the best that they can produce in every department of industry. The zeal among workmen to produce really beautiful works for these local expositions is constant, and the result is that in all the great towns there are permanent expositions; so that any artisan who has genius or skill has ever at hand a place where his work can be at once exposed for sale at a worthy price. The effect of this on German manufactures and commerce is already marked. The old supremacy of the art industries of Nüremberg and Augsburg before the Thirty Years' War seems about to return. The carpets of Saxony, the artistic iron-work of Wernigerode, the bronze, brass, and steel work of Berlin, the glass-work of Silesia, the mirror-work of Cologne, the carved furniture of Munich and Coburg and Mainz and Dresden, are already encroaching in a large degree upon the art industry of France. Here is a lesson for us. In this metropolis, and in every one of our greater cities, we should strengthen our museums of modern industrial art. Such museums should be composed not merely of rarities and oddities of past times; they should show examples of the choicest art industry of these times in England, Germany, France, and Italy. They should be schools of beauty of form and construction to every industry into which beauty enters; and every industry in our country would sooner or later be quickened by them.

There is all the more reason for our attention to art in industry, because in the fundamental basis of our construc-

tive industries we excel Germany. Probably no man in Germany will believe the truth—yet it *is* a truth—that the materials of workmanship are selected and the processes of workmanship conducted in America far more conscientiously, as well as far more ingeniously and economically, than in Germany. For example, no American maker of the slightest reputation, even in the smallest towns, would think of putting into the commonest furniture the wretchedly seasoned material which is frequently used in Germany for the most artistic work. Of a vast number of ingenious and valuable constructive methods and processes common among us they know little or nothing. All that our artisans need is schooling upon the artistic side.

I pass next to the development of the physical force of Germany in her *military system.* The first modern step in this development was made by Frederick William I. of Prussia, and by his son, Frederick the Great. The dangers which beset the Prussian state in her path to greatness led the first of these rulers to develop, and the second to learn how to manage, a great army infused with a patriotic spirit and taught a conquering method. This army having gone to decay under Frederick William II., and to ruin under Frederick William III., was baffled by the French Republic at Valmy, and trampled beneath the feet of Napoleon at Jena. Then it was that a new epoch was begun by a quiet, thoughtful great man—Scharnhorst. He it was who by stealth, despite the opposition of Napoleon, laid the foundations of a new military system.* This system it was that the present German Emperor gave all his efforts to develop.

* For a brief but vigorous handling of this death and resurrection of Prussian military power, see Treitschke, I., 2–3, though he treats Frederick William II. much too gingerly, as indeed all Prussian historians do.

Night and day, first as Crown Prince, afterward as King of Prussia, and in these later years as German Emperor, he has given his best thought to perfect this instrument for the unification and preservation of his country. Out of this effort have been evolved the planning genius of Moltke, the organizing genius of Roon, the fighting genius of Frederick Charles. Had there been, as the controlling influence in this evolution, a Bourbon or a spurious Napoleon or a Hapsburg, we might have seen evolved from the system not the best military men, but the poorest. We might have seen poor creatures like Marshal Soubise, whom Louis XV. sent to be soundly beaten by Frederick the Great, or like Marshal Lebœuf, whom Napoleon III. allowed to organize a military system which fell to pieces at the first attack, or like the Austrian field-marshals whom the House of Hapsburg has sent out in every generation to be beaten. Fortunately for Germany, in William of Prussia were combined strength, common sense, clearness of vision, tenacity of purpose, and a spirit of deep patriotism.

The German army of to-day is undeniably the most perfect of its kind. It has been my fortune to discuss it with leading military representatives of the various European powers at the great reviews, and they have acknowledged that no other army of the present day shows in any such degree the qualities of a vast living organism infused with patriotic confidence and answering to its head as body to brain.

The army ready to march at any moment numbers about seven hundred and fifty thousand men. The reserve ready to take arms on a few hours' notice is about three hundred thousand men. The garrison army ready against invasion numbers upward of four hundred thousand men. Here,

then, are nearly fifteen hundred thousand men, fully trained, knowing just what they are to do, and back of them the whole nation, in which every able-bodied man is a trained soldier.*

Much has been said of the tremendous burdens imposed upon Germany by its military system. They are undoubtedly great, and steadily growing greater; yet the wonder is that so vast a system is carried on so economically. It costs directly, in round numbers, 100,000,000 of our dollars a year, while the little English army costs about $80,000,000. Still, it should be remembered that the German system sacrifices the best three years in the life of nearly every young man; and, besides this, two months every year for four years afterward.

So far as taxes are concerned, it is undoubtedly less burdensome than it would be made in any other nation—and here it is only just to take a look at the system from the standpoint of German patriots. While they lament the necessity imposed upon their country by her geographical position, with great hostile powers on every side, and while they groan over the crushing burden imposed, not only by the taxes to support the army, but by the removal from productive industry of so large a number of the most vigorous youths, they claim that there are some compensations. They lay stress upon the service rendered by the army as a great school in manly virtues. It takes every young man, rich or poor, and obliges him to serve,—the son of the noble

* See Baring-Gould's "Germany, Past and Present," Vol. I., Chap. 10. The army has been increasing steadily since Baring-Gould wrote. See also for general features of the organization recent numbers of the American "Diplomatic Relations;" also Peters' translation of Müller's "Political History of Recent Times," N. Y., Harpers, 1882, p. 305, note. For figures see Maurice Block, "Annuaire" for 1882, and "Almanach de Gotha" for 1883.

and of the merchant prince,—the son of the poor shopkeeper and of the peasant. It trains him to habits of order, quickness in perception, promptness in execution, self-control, fortitude, readiness both to obey and to command.

It certainly gives scope to the activity of many young men who otherwise would find none. To the class of rich men's sons, for example, many of whom would otherwise go to ruin, the army affords a school and a career. Hence one of the greatest surprises to a stranger who penetrates German society. He goes to court or to some other brilliant assemblage, and sees these gilded youth whirling in the dance until midnight, apparently incapable of serious occupation. But next morning in his walk he meets the same men begrimed with dust and besmeared with sweat, bringing their troops from the morning exercise. Before daylight these young men were hard at work, filled with responsibilities, with a sense of duty, with inferiors to care for and superiors to win over by good service.

So much from a patriotic point of view. But, even taking these statements at their full value, a thoughtful American will hardly agree that the crushing burden of these armaments of Europe finds in these facts alone adequate compensation. Even though he has observed how, in each of our large cities beaded upon the railways from New York to San Francisco, there is growing up a class of rich men's sons, indolent, vapid, inane, without capacity for business or taste for science, literature or art, or purpose or desire to do anything or be anything, he will probably say simply that there are compensations in all destinies, and that remedies may be worse than diseases.

The great question of a reduction of the army comes up often, but the real tendency for years past has been towards its continual increase. For this increase Bismarck fought his hottest battles, and every year Moltke rises in the Parliament and shows the necessity of enlarging the army budget. Few Parliamentary spectacles are more noteworthy. Quiet and simple, appearing rather the kindly professor of metaphysics than the renowned leader of armies, Moltke speaks not merely to the Parliament, but to all Europe. He shows that the consolidation of the empire demands that the army be kept at the highest point, and that, to preserve German unity and to ward off France from the old German territories recovered in the late war, this generation and the generation which follows must pay the price. He does not hesitate to declare that for fifty years Germany must be kept in the highest condition of military efficiency.

He is perhaps right. But may we not hope that, long before fifty years are past, there may come by common consent a great disarmament of Europe? May we not hope that the method of international arbitration already begun between Great Britain and the United States may long before that become the rule and war the exception?

One characteristic of the German people certainly gives reason for hope in this respect. Though a nation of soldiers, they are peaceable and peace-loving. There is no fancy for soldiering, no passion for the pomp and circumstance of war. It has only been in obedience to a deep sense of duty that the nation has ever consented to fight its neighbors. Despite its splendid military organization and all its recent triumphs, the nation has never shown any disposition to brandish its army in the face of Europe.

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There is certainly a deep feeling of national satisfaction and of pride in the military achievements which secured German unity; but there is no boastfulness over the past—no threats as to the future. This certainly augurs well for peace and civilization.*

And, next, I would take up some features in her *political development.* Nowhere is more clearly seen the evolution of a higher activity out of a lower by patient thought and earnest effort.

The two centuries which followed the peace of Westphalia in 1648 seemed to take out of the German mind all capacity for effective political thinking. Everywhere was disunion, despotism, pedantry. Local jealousies took the place of national patriotism; favorites took the place of statesmen; political work was mainly cheatery; political thought, mainly intrigue.

Yet in every generation came strong men who persisted in political thinking. Thomasius, Stein, Hardenberg, Fichte, Dahlmann, are types of the men who persevered in this effort to evolve Cosmos out of Chaos.† Just two centuries after the peace of Wesphalia came the Frankfort Parliament of 1848. There was an assemblage of learning, talent and genius such as could have been brought together in no other

* For a very thoughtful and eloquent statement on this point, see a recent article on "The Liberal Party in Germany," by Baron George von Bunsen, in the *Fortnightly Review.*

† For these men, in addition to the more heavy biographies, see excellent summaries in Biedermann and Treitschké. Upon Stein and his great services, political and administrative, we have a better work in English by far than any in German, one which has happily done away with the necessity of wading through Pertz's fearful book—viz., Seeley, "Life and Times of Stein," Boston, 1879; one of the books best worth reading by a thoughtful American. The treatment of Stein by Alison in his History of Europe, though enthusiastic, is inaccurate. On Dahlmann there is an excellent essay in Treitschke, "Historische und Politische Aufsätze."

country. But it soon appeared that most of its best political thinking was but political dreaming—and no two dreams alike. This great assemblage was unable to do that simple work in political construction which we have seen so often done on this side the Atlantic by delegates from mining-camps and cattle-farms.

But men continued to think and work in the light of this experience, and their earnestness has brought its reward. Ideas have been brought to bear on events. These last thirty years have developed practical political activity until the taunt of Heinrich Heine has become pointless; for Germany must no longer yield to France the empire of the land, or to England the empire of the sea, or content herself with the empire of the air. Her feet are planted at last upon the solid earth, and she walks a power among the political affairs of men.

In this transformation the local legislatures of the German states have proved valuable centres for political training. The result of this training is now seen in the Parliament of the new empire.

This gives promise of becoming one of the best deliberatives bodies in existence. Its steadiness, its independence, its dignity, impress every thoughtful visitor. The speeches have in them little of the old Frankfort metaphysics, and still less of the old revolutionary declamation. They are of moderate length, and to the point. There are indeed extremists on both sides—fanatics in conservatism, and fanatics in radicalism; but they take little hold upon the great mass. There is nothing of those paroxysms of frenzy seen in the French Chambers; nothing of that tumultuous heedlessness seen in some legislative bodies nearer home. The members are generally in their places.

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They are not in the courts trying suits; not at the departments seeking patronage.

Complaint is sometimes made regarding the number of political parties in Parliament. Instead of two, as with us, there are half a dozen and more, each representing some shade of opinion between extreme conservatism and extreme radicalism. But, for any difficulties thus arising, there are some compensating advantages. The danger of combinations is offset, perhaps, by the greater freedom of political conscience.

To a stranger, the most striking thing in the Parliament of the Empire to-day is the position of the man who has done most, both by his political virtues and his political vices, to educate the Germans to political activity—Prince Bismarck.

The great Chancellor sits with other ministers at the right of the President. He is by no means constant in attendance. Sessions have gone by in which he has appeared not more than twice or thrice. At first hearing, he is anything but a good speaker. His great bulk seems to labor in vain to produce his thoughts. In this man whose speeches fill volumes there seems at first a fatal want of fluency. There come puffings and wheezings, statements irrelevant, sentences involved, when suddenly comes a word which lights up a whole policy, an epithet which withers an adversary or a party, a phrase sure to burst upon the nation as a watchword. Then perhaps some loosely-strung reminiscences, and suddenly from their midst a pungent historical statement. Then, it may be, after a mass of rambling egotism, a series of cogent arguments playing over the assembly like lightnings; and then, after a half sad, half discouraged monologue, a burst of defiance towards his enemies, an

appeal to the German nation, an appeal to posterity, which stirs the whole assembly—nay, which stirs the whole nation. There have been in modern States many men who have spoken far more eloquently; but hardly any who has spoken with such power.

In all his speaking there is a strange mingling of defiance with persuasion. He learned long ago to govern despite the majority; and, save in times of dire peril, or in the first flush of gratitude for his vast services, he has generally had a majority against him. Measure after measure may be rejected, but he returns to the charge as determined as ever. In justice to him it should be said that his retention of office despite an opposing majority in Parliament is the result of no mere despotic whim or passion for place-holding. He simply refuses to conform to the English constitutional view in vogue among the constitutional monarchies of Europe. And, however strong may be our sympathies with the ardent lovers of liberty who are at present opposed to him, we may well believe that this instinct of Bismarck has in it much of right. The great misfortune of the constitutional governments of Continental Europe seems to me to be that they copy in a servile way that feature in the English constitution which makes the executive power—that is, the ministry—dependent upon the will, or even the whim, of the legislative power.

Though historical and social causes have made this work well in England, it cannot be said to work well among the Continental governments. The state of things in most of them, under which new ministers succeed each other with almost every change of the moon, certainly cannot be a final system. A system under which, just as soon as one ministry is installed, all the ambitious men in the legislative body

begin plotting and combining to thwart and oust it, in the hope of picking up places in the ensuing scramble, is certainly not conducive to the national welfare, materially or morally. Attendance upon the sessions of every important legislative body in Europe has convinced me that for the Continental governments our American plan of making the executive independent of the legislative power, as regards its tenure of office, is vastly better than the English system of making the executive subservient to the legislative. My belief is that this long-continued struggle in Germany will result in some well-defined adaptation of the American system.

Nor is the Chancellor less bold and defiant in the external policy of the Empire. A striking example of this is seen in his dealings with Russia. At first glance over his earlier history we might expect that his leanings would be toward her. His impatience of legislative trammels, his early alliance with the Russian Cabinet, his residence at St. Petersburg, the relationship between the ruling houses of both countries, might well tie him to Russia.

But just here comes in that feeling which has given him such hold upon his country. This is his real German patriotism, his sense of the dignity of the new Germany, his devotion, above all things, to German unity. This is clearly the mastering feeling of the man. No more of the old subserviency to Russia. No more shall Prussia grovel as at Olmütz. No more shall Germany receive her policy from a Nicholas or an Alexander. Some of the methods taken by Bismarck to impress this fact upon Russia and upon Europe seem almost the manœuvres of a political desperado. For many months, when there was widespread dread of war with Russia, he never seemed to miss an

opportunity to provoke war. His semi-official paper was continually making thrusts at Russian aspirations. It grew to be a general belief that a leading article of more than usual defiance toward Russia indicated the presence in Berlin of some Imperial Russian Prince. The game was boldly played, but it has succeeded. Prince Gortschakoff has left the Russian Chancellorship forever, and his successor, De Giers, has made a pilgrimage to Varzin.

The same patriotism rising above early prejudice is seen in his dealings with Austria. Devoted though he was to her in his early manhood, he had fought her ever since. At the old federal council-table in Frankfort he had been her worst enemy. His deepest thoughts and his most bitter witticisms had been at her expense. For a quarter of a century his main effort had been to shut her out of Germany. He had beaten her in diplomacy; he had beaten her in war; she was at last at his mercy. Yet in that hour of triumph he was too wise to remember the old policy of Schwarzenberg—"to degrade Prussia, and then to destroy her." He refused steadfastly to humiliate Austria by marching Prussian troops into her capital. What he meant was seen when, in 1879–80, he brought about the German-Austrian alliance—a masterpiece of statesmanship.

So much for his external policy. As to his internal policy, it is as yet chaotic. What the judgment of history will be is yet uncertain. But there is one feature in it so far developed as to be worthy of notice—his dealings with the socialistic movement.

That this movement needs careful study is undeniable. In the nation as a whole it has little strength. In the larger cities it sometimes shows great strength. Take one example. During my last residence in Germany, I visited Ham-

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burg to witness the election of a member of parliament. The only candidates publicly mentioned belonged to the conservative, national-liberal, and progressive parties. Their names were flaunted on the banners and glorified in the newspapers; no other candidates were heard of.

Next morning I read the returns, and behold, a new name, before unnoticed, a socialist, elected triumphantly!

For socialists who merely *orate*, who would simply erect a rostrum on a heap of ruins—mere mountebanks bloated with beer and daubed with blood—Bismarck has no mercy. For socialists who *think*—who would establish a body politic without the cancer of pauperism, he has shown sympathy. To Lassalle, the most brilliant of them, he has paid a public tribute; and one, at least, of Lassalle's disciples stands very near him. The reason is simple. The fundamental theory of the leading thinking socialists is that the State should make the people, and not the people the State, that the State should be the employer and the people the employed, that to this end business of every sort should be more and more absorbed into the control of the State,—in fact, that the government is best which governs most. To such a combination of powerful intellect and will as exists in the chancellor, this is most attractive. Hence his efforts for increased interference of the government in agriculture and manufactures; for State ownership of railroads; for State manufacturing of tobacco; for State insurance of the working classes against death and accident; for all steps toward State omnipotence and individual insignificance. This experiment which the great chancellor is trying is intensely interesting, but it can only be judged by a future generation.

He has, I need hardly say, "the defects of his qualities."

His interference with ordinary details of internal administration, his playing of factions against each other, will probably be regarded by the future historian as freaks of genius not to be mentioned on the same pages with the splendid record of his dealings with international affairs. Such matters as the prosecutions of Mommsen and Bunsen, and the speeches on city taxation in Berlin, will doubtless be considered simply as motes floating in the splendor of his main achievements.

Curiously enough, the one thing which he deprecates most, the sturdy opposition by Parliament, will probably do most to prevent any great mistakes which might tarnish his fame. But, in one matter where external and internal policy are combined, history may proclaim him wiser than his adversaries. Whatever may be the minor defects of his policy as regards the older church, its main lines seem dictated by patriotism and statesmanship of the highest order. In combating the undue pretensions of ecclesiasticism centering at the Vatican, he is fighting not only the battle of Germany, but of the whole civilized world—and of Catholicism no less than Protestantism.

As to the attitude of the crowned chief of the State in public policy, the Emperor William is by no means a ruler of the old type which so long afflicted Europe. While yet in his youth, he foresaw that a Prussian army must carve out a new Germany. His tenacity in this view, his standing by his great Minister upon this idea at the apparent risk of his crown, is matter of history. Two great characteristics are peculiarly his own, and these are—keenness in discerning men of military and statesmanlike genius, and tenacity in holding to them despite all

opposition ; another characteristic he has--a quality of his race—the sturdy sense of duty to the state,—that feeling which distinguishes the Houses of Hohenzollern and Savoy from the Bourbons and Hapsburgs. No man living has done so much by his character and actions to turn the tide of democracy as has the present German Emperor. Complaints are frequently made, both against him and his Chancellor, that they yield so little to modern constitutional methods. The wonder is that they yield so much. The simple fact which sums up the political status of Germany is this : The whole existing system is undoubtedly transitional. The present reign is the bridge between the old Prussian absolutism and a new constitutional liberty based upon a well-guarded relation of rights to duties.

I call your attention next to the *civil administration.* The work of Grotius and Puffendorf in enforcing a better fundamental theory of law; the work of Thomasius in fighting legal monstrosities, torture in procedure and the like; of Frederick the Great in bettering the codes; of Stein in shaking off feudalism, are but preliminary to the modern civil fabric. But out of this whole development I call your attention to just two features which have wrought powerfully for good on Germany, and which will work not less powerfully for good on any nation willing to profit by German example. The first arose out of the work of that greatest of German geniuses in reform between Luther and Lessing—Christian Thomasius. He it was who began the efficient training of young men for the service of the State at the University of Halle. By his exertions, instruction, which before had been pedantic, was made living. Therefore it is that at this day in every part of Germany, in

nearly all its greater universities, you find courses of advanced instruction not merely for training men to the law, to medicine, to theology, to science, to literature, but to the service of the State.*

In these are trained the men who have steadily developed reform in every branch of the public service,—who have lopped off one and another of the old abuses—who are constantly destroying germs of new abuses—men who are to-day advancing and carrying out with scientific accuracy the vast and complicated system of imperial administration.

I do not, of course, recommend that system of administration for our adoption. I am convinced that it would be even worse for us than our present civil service, and that is saying much. Germany and the United States, as regards civil administration, stand at two opposite poles. Here the maxim practically prevails, "That government is best which governs least;" there the maxim practically prevails, "That government is best which governs most." I decline to accept either of these pretty phrases as a serious basis for government; but, of the two, I prefer our own. As an American, while regretting the many evils of our excessive individualism, I cannot but be proud of its main results; and among these that initiating power which does not hesitate to grapple with the most stupendous problems, and undertake the most enormous enterprises; that civic spirit which leads private individuals to lavish millions every

* It is curious that neither at Leipsic, where Thomasius rendered great services at the risk of his life, nor at Halle, which was the main theatre of his magnificent career, is there as yet a public statue to him. Berthold Auerbach asked me what thing surprised me most in Germany and I mentioned this fact. It is evident that if "Republics are ungrateful" they have some very respectable monarchies to keep them in countenance.

year upon objects conducive to the public good; that hopefulness which no calamity can discourage; that spirit of self-help which does not ask, "What will the government do?" but, "What shall *I* do?"—the spirit which gave us in our civil war the men needed to grapple with it, and which, in any emergency, brings men ready to meet it. I am not in love with that extension of the civil service known as German bureaucracy. Yet embodied in their system are principles which we may well think upon; and here is one—that it is an advantage, nay, a necessity, to educate men for the State service. In my judgment, our greater universities can render no more valuable aid to the country than by establishing courses in history, political science and general jurisprudence, in which, as in the German universities, young men can be trained to discuss questions of political economy, finance and general policy, in public meetings, in the press and in legislative bodies, not as demagogues, but as men who have kept abreast of the best thought of our century. Glad am I to state that already three or four of our larger universities have made a good beginning in this. But here opens a second matter of even more pressing importance.

For the fundamental theory of the whole German civil administration is that every official, from the Chancellor of the Empire to the pettiest clerk in a country post-office, is to act entirely in the interest, not of any man, or any clique, or any party, but of the entire nation; that offices are not "spoils," distributed by party leaders, but trusts imposed by the entire people; that the basis of choice to office should be not adherence to this political party or service to that political manager, but capacity and integrity; that capacity and integrity should be shown, not by dancing

attendance upon party leaders, or whining at the doors of men in power, but by competitive examination, periods of probation, and promotion upon approved merit; that, good servants for the state being thus secured, they should be retained on the same principles which lead a man of business to retain as long as possible an employé found capable and honest, and faithful; and, finally, that this employé should be treated as a responsible human being; not driven to advocate principles or support men opposed to his conscience. In short, the fundamental principle of the German civil service is republican in the highest sense.*

Especially noteworthy is the *administration of justice.* From the days when Thomasius fought against procedure by torture, and Frederick the Great with Cocceii and Carmer perfected the Prussian codes, there has been a steady development of law, strict but just. There is far more interference with the individual will than Americans would tolerate. I should regret to exchange the fundamental methods of our common law for those of their civil law; yet we might learn of them some precious lessons. The German procedure does not throw about a criminal in the nineteenth century safeguards framed to meet the needs of the fourteenth. It gives him a thoroughly fair trial; it sees justice done, but gives as little scope as possible to chicanery and pettifoggery. The endless appeals from court to court, new trials on the slightest pretext, the system of making crime easy and repression difficult, that system which has built up in our great cities an organized criminal class—a system which has at times enabled leaders

* Since the above was written, the passage by an overwhelming vote of our Civil Service Reform Bill has made a beginning of a better order of things with us—a system, let us hope, in which may be united German steadiness and thoroughness with American "initiative."

of this class to dictate terms to those who represent order and justice—of this Germany knows nothing. I may add that Germany knows nothing of "trial by newspaper," whether preliminary or supplementary.

Interesting, too, is the *municipal* administration.*

Since the establishment of the new empire the German cities have been much affected by the revived national spirit. Every town seems to show an appreciation of the new national destiny. This feeling is made manifest in dignified municipal buildings, in parks, in better sanitary arrangements, in public improvements of every sort. At the centre of all this lies an idea of the government of cities essentially different from our own; yet, in the light of history, the only one on which cities can ever be satisfactorily developed or governed. This idea is that a city is a *corporation*—that while, as regards *national* affairs, the interest of the individual may be characterized as political, as regards *city* affairs, the main interests are financial. Hence it is that while in Germany national interests are largely entrusted to universal suffrage, city interests are guarded by suffrage based upon the payment of taxes.

It is entirely contrary to the German idea that those who pay no taxes in a municipality should impose taxes upon those who do. City government in Germany is mainly a tax-payers' government. The result is a civic economy and dignity of which our great cities know comparatively little. To the city councils of Germany men of the highest character and attainments are elected, and are proud to take their

* For accounts of the administration of Vienna and Berlin, see the reports in recent volumes of *Diplomatic Relations* published by the government of the United States; the first in a despatch from Mr. Kasson, then Minister at Vienna, the second in a despatch from Berlin.

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seats at the city hall. Rudolf Gneist, famed as a professor of law throughout Europe, a member of the Imperial Parliament, the representative of the Emperor William as arbitrator between the United States and Great Britain in the matter of the northwestern boundary, is a member of the Berlin town council; and with him are associated others of similar standing. The result is that, while Berlin has a municipal life at the same time dignified and economical, with streets well paved and clean, with a costly system of drainage, with noble public buildings, with great works of art in these as well as in her parks and squares, and with life, liberty, and the pursuit of happiness well guarded, the whole government is carried on for but a trifle more than the interest on the public debt of the city of New York—and Berlin is a city of eleven hundred thousand inhabitants, far less favorably situated, from a sanitary point of view, than is our own metropolis.

We do not need to have a servile imitation of Germany in this matter; we need not revolutionize our system of city government; we need simply to develop it in accordance with a wise statesmanship. In so far as a city is a corporation, let it be managed as such; in so far as it is a political body, let it be managed as such. Let there be executive officers and a legislative body, or board of aldermen, to represent the whole people, chosen by the whole people; and let there be a city senate, or board of control, to represent financial interests, chosen by the tax-payers.

The next point which I will present is the *intellectual* development; and I shall confine myself to that part of it wrought out by public instruction.

Here as elsewhere the present has been evolved out of the past by long-continued thought, work, and struggles.

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Such men as Melanchthon and Sturm in the 16th century, Comenius in the 17th, Rochow, Basedow, and Münchausen in the 18th, and William von Humboldt in the 19th, have all pushed on this great interest. There have been struggles against mistaken economy, as in the time of Frederick the Great—struggles against the orthodox reaction, as in the time of Frederick William II. and Frederick William IV.; but there has been steady progress, until it now stands confessedly the first in the world. The new empire recognizes its duty to this system and is worthily carrying out the great traditions of Prussia and the House of Hohenzollern.* A few words in regard to its general development may be useful. As to primary instruction, a most important point is that the teacher's vocation is not known as a temporary expedient, but as an honorable profession. Teaching is made a lifework. The teacher must show thorough fitness. He is not taken because he will work cheaply, but because he will work well. His purpose is not to load the mind of his pupil with unorganized facts, but to develop it symmetrically. Above these lower schools stand the gymnasiums and the *Realschulen*—one giving the higher intermediate education in the classics, the other in modern studies. Taking both together, the number throughout Germany is very great, giving one of these intermediate colleges for every seventy thousand inhabitants. The thoroughness of this equipment may be seen in

* Out of the mass of the more accessible publications on German higher education, I would suggest, for summaries brief but masterly of this policy, Giesebrecht's "Rektoratsrede zu München" (in his "Deutsche Reden," Leipzig, 1871) and Sybel's "Festrede zu Bonn" (in his "Kleine Historische Schriften," Munich, 1869); for more extended accounts, Karl Schmidt's "Geschichte der Pädagogik," vol. iv, and Hoyt's Report; also Barnard's collection. For a useful and accessible university monograph, see "L'Université de Bonn," by Dreyfus-Brisac, Paris, 1879.

the fact that, if the State of New York were provided for in the same proportion, she would have about seventy colleges, every one far better and more extensively equipped than any of her existing institutions save three. As to the highest instruction, there are twenty-one universities, of which the largest, at Berlin, has over five thousand students;* the six next in rank, over one thousand each; the smallest, at Rostock, about one hundred and fifty. These institutions are thoroughly equipped, as regards both men and means; but their main strength lies in their freedom from all sectarian and political trammels. For over one hundred years there has been in them, as a rule, the greatest liberty of thought and speech.†

Virtually on the same grade with the universities are the polytechnic schools, of which there are about twelve. Of these I have spoken already.

Beside all these, there are colleges of mining, agriculture, forestry, etc., of a high grade, and a multitude of special trade-schools of lower grades; and, while the universities constantly send new and vigorous life into what is known as the learned professions, these great polytechnic and trade-schools are constantly strengthening every branch of art and industry.

The first great feature of this system which I ask you to note is its unsectarian character. Such a thing as a university carried on by a sect, in which the test for all professors, or for most of them, shall be their acceptance of some particular creed or formula is unknown. Indeed it is utterly

* The number, as given in the Leipsic "Illustrirte Zeitung," January, 1883, is 5,990.

† The case of the "Göttingen Seven" and the very rare outbreaks of petty tyranny elsewhere must be taken as exceptions which prove the rule.

impossible to make any German understand why there should be, or how there can be, Lutheran mathematics, or Calvinistic classics, or Episcopal natural philosophy, or Unitarian chemistry, or Baptist geology, or Methodist botany. To the German, the fundamental idea in choosing professors is, that the best qualified man shall be taken, no matter what his peculiar form of belief. That system which limits the college or university in its choice of professors virtually to one sect—the most dwarfing system ever applied to education—is something of which Germany now knows nothing. Is a place vacant in a German university, the authorities look over the entire nation, and select the best man for that place, asking no questions as to his religious or political views. They have confidence that the Christian religion is strong enough to endure, even if the instruction in the country be given by men fitted for it, without regard to sectarian connections. The result is that, even in the darkest hours of Germany, her universities have been centres of enlightenment and freedom.

The other great peculiarity in the German educational system is the recognition of the fundamental principle that for the lower education the rule should be diffusion of resources, and for the higher education concentration of resources. While thus the primary schools are numbered by thousands, and brought almost to the door of every peasant, and while the gymnasia are numbered by hundreds and placed at centres of population within easy reach of all, the means of the higher education, as we have seen, are concentrated in the twenty-one universities—as a rule, one in every province. Here is a great lesson for us. The reports of the Commissioner of Education at Washington show that there are in the United States over three hundred

and sixty institutions attempting to do university work. The result is, that we have a vast number pretending to do that which they have not the means to do.

Germany indicates to us the path out of our own educational chaos. Let twenty or thirty of the best equipped among our existing American colleges aim more and more to do university work. Let these receive for advanced instruction such students as are at present taught in the junior year of our colleges. Let the other institutions, nearly three hundred and fifty in number, with the multitude of others which will be added to them, become intermediate colleges, taking young men two years earlier in the course than they now do, and carrying them up to the studies of the junior year. They would hold thus an intermediate position between the common school system and the universities akin to that which is held by such honored colleges as Eton and Harrow and Rugby and Marlborough in England.

I do not mean to indicate this as immediately practicable, —unfortunately, too many prejudices are arrayed against it; but it is to be hoped that wise men will regard it as an ideal. Thus shall we have a system vastly better than anything we can ever secure with our present methods. Allow me to recapitulate this lesson which Germany teaches us.

Let the public school system be continued as we have it now. Let there be, next, an intermediate college education, taking the pupils at the highest grade where the public schools leave them, and carrying them on through the first two years of the existing college and university courses. Finally, let twenty or thirty of the largest and best endowed among the existing universities, receive young men from the colleges, say at the beginning of the present

junior year, for more advanced instruction—technical, professional, scientific, literary, philosophical. Thus, and thus alone, can our educational system be made worthy of our country.

As to educational methods we need make no servile copies. With all my admiration for German instruction, I must confess to a conviction that in many of the schools there is too much scholastic pressure, that the youth are forced to learn too much and think too little, that there is danger of breaking their power of "*initiative*,"—of sapping their original force. As I have sat before classes in sundry gymnasia, or among students in sundry universities, I seemed at times to see a lack of that reserve vigor which does so much for American and English students in active life. But making allowance for all this, German example remains by far the best source of improvement in our educational system.

As to *science* in the German Empire, I might speak of the development from Melanchthon to Helmholtz and Hofmann and Virchow and DuBois-Reymond, of its enfranchisement from any limitation save that imposed by its own conditions, and of the splendid provision made by the new empire for its further development, in the shape of libraries, laboratories, observatories, and expositions. * In *literature* I might note an evolution hardly less wonderful. In *art* I might take as a topic for this or for a course of lectures that development extending from the

* I note Melanchthon's "*Initia Doctrinæ Physicæ*" (see the "*Corpus Reformatorum*," ed. Bretschneider, Halle, 1846), as marking a natural starting point of the modern development. For some interesting recent studies on the progress in this enfranchisement of science, see Sigwart, "Kleine Schriften," Tübingen, 1881.

cathedral builders to the contemporary masters in painting and sculpture.

But I shall content myself with presenting only one phase in this evolution, and that because it gives us a lesson by which we may easily profit. This lesson is found in the creation throughout Germany of museums of modern art. As typical, I would name the National Gallery at Berlin, the new Pinacothek at Munich, the Städelsches Institut at Frankfort, and the collections of recent art at Cologne and Dresden and Königsberg. These are devoted mainly to the works of living artists. In this fact is our lesson. Whatever light we can gain from the older masters in painting and sculpture should be secured. To add to an American gallery a single stroke from their renowned pencils is a precious service, and no chance to do this ought to be lost; but the time has gone by when any considerable number of such master-works of those great genuises can be secured. On the other hand, it is entirely within the power of men of wealth and patriotism to endow in our American cities public galleries of modern art which shall soon take rank among the foremost in the world. The private galleries of our great cities are to-day hardly surpassed by any. Two or three public galleries have made an excellent beginning. Were these public galleries suitably endowed, commissions could be given to living masters which should soon make of this city an art centre, attracting art students from all parts of this country and from other countries. The creation of endowed galleries of modern art is the first lesson. But there is a second lesson; and this is to be found in the collection of Frederick William IV. at Potsdam, and in the Schach collection at Munich. They simply embrace copies from

the leading master-works of the greatest masters, made by young artists of genius. Travellers direct from a study of the originals in Italy, linger with pleasure in these galleries and find enjoyment in these copies. In my judgment, such copies have proved more stimulating to the public sense of beauty than originals of inferior works of the grand masters could have been. It would be an admirable thing to profit by this example, and to employ a few young American artists of high talent in copying the master-works of Europe under the direction of competent judges, and then to bring these copies together as part of an art museum in this metropolis. And there is a third lesson. In sundry towns, as at Berlin, Munich, Bonn, Stuttgart, you may find carefully arranged collections in plastic art,—casts of the most noted works of sculpture, arranged in the order of development, from the earliest period to the latest. Their mere presence in a city creates that higher sense of beauty, that more perfect sense of form, which alone can make the bloom of art in any nation possible. And finally, one lesson more is to be found in the museums of industrial art in the provincial towns of Germany, of which I have already spoken.

I would next present a few points regarding the *social development* of Germany—a few of those things which seem most important as regards an understanding of the current daily life and feeling throughout the new empire.

The tourists who skip along the edges of German life and graze the surface of German society, bring reports of the social condition of the country sometimes amusing, sometimes appalling.

The Englishman is often plunged in deep distress. He tells us that since the creation of the new empire he

notices a lack of that deference once so grateful to the heart of the travelling Great Briton. He notes an increase of national self-respect, of indifference to foreign opinion, of national pride. This state of things strikes him as altogether wrong. He cannot understand how Germany, or indeed any nation—save England—can ever desire to extend her territory, or indeed attempt to hold it together if any other nation desires to tear it apart. He cannot see why any German, or any man, save an Englishman, should indulge in national pride. He asks with amazement: Why should Germany wish national unity and independence?

Even more troubled is the typical French traveller of these days. He cannot understand why any nation should wish to make conquests of neighboring territory or to hold them after she has made them. He cannot understand why "M. de Bismarck" should prefer the good opinion of his own country to that of France. And if the traveller be M. Victor Tissot, he laments over the immoralities which he has ferreted out in German towns, and, returning to his own immaculate Paris, hold up his hands in horror,—Zola joining in the chorus.

And our own dear countrymen are many of them severe. The more serious are shocked at seeing men, women, and children drinking beer and hearing music, when the men might be drinking brandy and fighting, and the women drinking tea and retailing scandal. The more practical are surprised at seeing time given to studying pictures which might be given to making money. And both together lament the habit among the lower classes of visiting the galleries of art after church on Sunday, instead of stupefying themselves in gin-shops and tenement-houses. Less serious

Americans are horrified to observe that many Germans eat with a knife, and that many more speak in their throats when they might speak through their noses.

To these charges, and to many more like them, Germany must, I fear, plead guilty. But, as one gets deeper into German life, some extenuating circumstances appear. First of these is the fact that, from his childhood, the average German has been trained to use the good gifts of God without abusing them and to believe in something besides the making of money. He often appears very gross in his real life; but he very frequently has an ideal which is better. To him the accumulation of wealth, without the accumulation of tastes which make wealth desirable, is ghastly. I know of no country where wealth simply as wealth secures so little social recognition,—where the absence of wealth detracts so little from social distinction. I know of no country where the poor man, if he have really valuable qualities, is more honored—none where the man made rich by scoundrelism is more indelibly dishonored.

The whole social system of Germany is pervaded with the idea that "man cannot live by bread alone"—that he has wants higher than any which money can supply. I know of no country where there is less of mere senseless luxury, less of mere vulgar ostentation.

Another thing may be noted in German life. Nowhere is mere noise more powerless. The great forces in German life are quiet forces. Sensation-mongering in the press, acrobatic tricks on the platform, accomplish little.

Striking to an American are the relations to society of the German press. Anything less "enterprising" than most of the German newspapers, even in metropolitan cities, can hardly be imagined. Weighty events passing in

other parts of the world are dismissed with a brief telegram, only to be resumed in an article perhaps weeks later. A presidential election in America is dismissed with the shortest possible paragraph. A great reform-bill in England, ushering in a new epoch, is barely mentioned in the despatches. Of that enterprise which leads our American newspapers to keep correspondents at every important centre of human action and to send correspondents with every great expedition, political, scientific, or military—which gives, every day, column after column of telegraphic news from every capital of the old world, and even from the depths of Asia and Africa—of this there is in the leading German press as yet hardly a trace.

So, too, with affairs not only in Germany, but in the very city where the paper is issued. There is an apathy to passing events which surprises an Englishman and astounds an American. When Heffter, one of the glories of Germany and of Europe in international law, and when Lotze, the one great German philosopher of these times, died in Berlin, the general reading public knew little if anything of either event until they saw the funeral processions. In England every metropolitan newspaper, and in America every newspaper in the larger towns between New York and San Francisco would, within twenty-four hours, have contained a careful biography and estimate of the life and work of the departed.

Then, too, there is a curious strain of injustice, especially in the conservative press, towards our own country. Everything supposed to discredit republicanism is dwelt upon and amplified; most things on the other side quietly ignored. There is one leading writer, thorough and pungent, who for years past has ransacked the American

journals to prove that American society cannot last a month. And, while there are upon the staff of every great journal many who can give you the latest theory of the iota subscript, there hardly ever appears one who has even an inkling of the real characteristics of this republic and the real forces at work in the steady evolution of a higher civilization. The treatment of many subjects in the German press is profound, but the usual discussions upon American affairs are amazingly shallow and inadequate. Time will, no doubt, remedy this. I have faith that some day *the* book upon the United States will be written by a German.

On the other hand, the German press has some great merits. There is very little pandering to a sickly, hysteric longing for personal news. A murder or an execution, which might be served up with head-lines and a whole array of sensation paraphernalia, is dismissed with a single paragraph in a corner of the paper. A scandal, which, in more enterprising lands, might be made to defile the breakfast tables of the land for a week, is not brought out at all. The inventive genius to which some other countries owe so great a part of their news columns is very little developed. Great pains is taken to give truths rather than "sensations." The leading journals will give you, if you will wait long enough, most careful statements regarding the explorations of Schliemann at Troy, of Curtius at Olympia, of Lenz in North Africa, or of Hayden in Northwestern America, or the experiments of some new professor at Heidelberg, or careful details regarding some measure laid before Parliament; but they are entirely deficient as to what the Hon. John Doe hinted to a reporter regarding the wicked intentions of the Hon. Richard Roe. They are generally so simple-minded as to give straightforward

statements of what was said in Parliament on both sides of questions.

Great sacredness is attached to personal character. I have heard severe criticisms passed by the public men of one party on the political acts of their opponents; but I never heard one public man say, or even hint, that another public man was corrupt. And here let me give a reminiscence of a different state of things. Several years ago I was travelling through Germany, and anxiously watching the newspapers for the result of the impeachment proceedings then going on against the President of the United States. One morning I heard a German read out to his fellow-passengers the latest telegram. It was as follows: "The President of the United States, Mr. Johnson, has been acquitted. Senator Fessenden, of Maine, was bribed to secure the President's acquittal." This was the report, sent straight from America, which all reading Germans had to ponder over that day and many days. How were Germans to know that Senator Fessenden, so far from being bribed, showed in this very act qualities worthy of the noblest days of Rome; that all his life long he had served his country most faithfully, showing in all things integrity and capacity; that, as a Senator, he dared brave the leaders of his party, the thunders of its national and State conventions, the pleadings of his friends, the howls of fanatics, the gibes of political managers, rather than aid in establishing a precedent for driving any unpopular President from his seat, and bringing in a republic after the pattern of Mexico and South America? Say what we will of the slowness of the German press, they are incapable of the sort of enterprise which not only takes pains to expose our dirty linen before the world, but befouls our clean linen

that it may display it; that enterprise, which shouted out so that all the world might hear, that Henry Wilson, who died at the end of a long life passed in the public service, leaving a mere pittance to his family, was a thief; that Fessenden was bribed; that Ezra Cornell was a "land robber"; in short, that every strong public servant who happens to cross the wishes of any faction is simply and solely a scoundrel. Of this Germany knows nothing.*

A great agency in keeping German society in every town bright and sweet is the drama. It is thoroughly clean. It has none of those characteristics which make parents shrink from taking their sons and daughters to the theatre in many other countries. The traditions set by Lessing and Schiller have been worthily followed by Gutzkow, Gustav Freytag and a host of others. The masterpieces of German dramatic literature are generally interpreted in such manner as to infuse into real life something of a higher ideal life. And here is one of the springs from which is fed that striking characteristic of German social life—the maintenance of an ideal of truth, beauty and goodness, even among so many of those absorbed in the ordinary daily humdrum. Take from German social life its vision of the ideal through the drama, through music, through art, and the great body of Germans would avow themselves unable to answer the question, "Why is life worth living?"

Glance now for a moment over the *religious and moral* development. Regarding nothing have so many opposing statements been made among us. On one side it is said

* For the darker side of the German press, see Wuttke, "Die Deutschen Zeitschriften," Leipzig, 1875; but some abatement must surely be made from his very severe treatment.

that Germany has sunk into entire skepticism; on the other, that Germany, having been formerly rationalistic, has returned more and more to a strict orthodoxy. From a direct acquaintance with that country now extending over nearly thirty years, from personal observation at six different periods during that time, from conversations with many thoughtful men and women in every great province, I feel warranted in saying that neither of these statements are true. There is probably no nation on earth in which the great body of men are so indifferent to creeds and formulas, proclamations of the divine intentions or denunciations of the divine displeasure; none where men whose strength lies rather in tongue than in brain or heart go for less; none where the search for truth is more fearless; none where a dogma stands less chance against a fact; none where Biblical criticism is pushed more relentlessly. Judged, too, by the standard of attendance upon public worship, Germany would not stand high. Less than two per cent. of the residents of Berlin attend church.

And yet I think it may be said that no country is at heart more deeply reverent towards the Highest, none more earnest in the search for truth, none more sensitive to the idea of duty, none more pervaded by a deep morality, none more open to sacred enthusiams for eternal right and justice, none more sturdily bent on making ideals realities. I cannot forget that, during the long struggle against human bondage in this country, only one European nation was Christian enough to stand by us against triumphant wrong, and that country was Germany. I cannot forget that, in the darkest hours of our fearful civil war, while other nations boasting Christian orthodoxy openly or secretly fostered American anarchy, and were

ready to make alliances with American slavery, Germany did neither. She alone had faith that there must still be justice in the universe, and gave us her hand and her heart. Despite the prevailing indifference to the claims of religion as usually presented in the churches, there are influences at work which hold Germany steadily to fundamental religious principles. The philosophy of Immanuel Kant may be named as one of these. Few greater blessings have been given to any country than that philosophy, which has implanted so deeply into the hearts of thinking men the idea of morality as a fundamental necessity of human life. Kant's categorical imperative—"the everlasting Yea," "the everlasting Nay"—are deeply imbedded in the hearts of those who really lead German opinion, whether in the Church or out of it.

When I hear Germany scoffed at as irreligious I remember the declaration of the Master, "a corrupt tree cannot bring forth good fruit," and I recall the great and good men—Catholic, Protestant, Jewish—who in every generation have labored to make the nation more beautiful and more noble, and the vast numbers who have thereby been made better and braver.

Vastly helpful in this has been German literature. No nation can be really irreligious or immoral which can produce such inspired men to uplift the race as Lessing, Schiller, and Gutzkow. Every generation in Germany comes to know and love them as probably the English-speaking race knows and loves no author, living or dead. The dramas, poems, and histories of Schiller, especially, form one of the most blessed gifts which any nation has ever received. They serve to keep German life sweet and pure. The thoughts of Schiller have become part of the

living stock of every thinking German man or woman. No student of German literature will deny that the genius of Lessing is higher, and the genius of Goethe more rare, and yet it is interesting to note that the German-speaking people throughout the world, when showing their gratitude to these great leaders of thought by monuments, always erect the first statue to Schiller.*

German religious reverence sends its roots deep into the past. A strong agent in keeping it alive is to be found in the hymns of the Church and the music connected with them. These hymns, laden with the highest hopes and aspirations of past centuries, take hold upon the German heart to-day. As the great organ in some ancient church strikes the first note, the whole congregation joins in the chorale. Whether the hymn grew from the heart of Notker, or of Luther, or of Paul Gerhardt, every man and woman has known both words and music from childhood. In the presence of this great influence, creeds and catechisms are as nothing. The men who hold them and the men who deny them are alike. Their aspirations are alike borne upward on those mighty billows of song. Whether they roll beneath the arches of the Catholic cathedral at

* For a brief and intelligible statement of Kant's position in the development of German thought, see Julian Schmidt, "Deutsche Litteraturgeschichte," first book, and for very suggestive passages as to the relation of Kant to Goethe and Schiller see, by the same author, "Schiller und seine Zeitgenossen," Chap. V. See also "Schiller's Ethical Studies," by Royce, in the *Journal of Speculative Philosophy* (St. Louis), October, 1878. Also the same subject from a somewhat different point of view in Dr. Franz Schnedermann "*Ueber die beiden Hauptperioden in Schiller's Ethik, mit Rücksicht auf das Verhältniss des Dichters zu Kant*" (Leipzig, 1878), a work highly spoken of, but which I have not yet had an opportunity to see. For a very clear and straightforward statement of these ideas by which Kant has wrought so powerfully on German literature, see President Porter's "The Human Intellect," and especially pp. 523–24. The main drama of Gutzkow is "Uriel Acosta."

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Cologne, or of the Protestant cathedral at Ulm, the service of praise comes from the hearts and voices of the whole congregation. And praise is not done by proxy. It is not delegated to a quartette club. I think that even those Germans who most thoroughly discard the received belief of Christendom would feel personally hurt to be thus robbed, *more Americano.*

Whatever, then, our own beliefs may be, it is not just to say that a nation is religiously dead in which the chords of the human heart thus respond to the loftiest and most religious utterance of all the ages. And when I am told that Germany is "sunk in unbelief," I recall again the words of the Blessed Master, "By their fruits ye shall know them;" and I remember that in no country is family life more pure; in none are the rights of individuals more sacredly guarded; in none is private character more carefully respected by the press; in none is private business carried on more safely, and public business more honestly; in none are science, literature and art pursued in a more high and reverent spirit; in none is there less debauching of young minds by the publication of sensation scandals; in none is there less irreverence and scoffing; in none is there a smaller proportion of drunkenness and ruffianism and crime. The fearful evils arising from intemperance, which so dishearten us in America, in England and in Scotland, are in Germany comparatively small. The ruffianism which takes such monstrous shapes in English-speaking countries, is in Germany almost unheard of. It is a literal fact that in five different visits to Germany, in a residence extending altogether over four years, in capitals and in villages, in times of mourning and in times of festivity, while with every man, woman and child who can afford

it the custom is to drink wine or beer, I have never seen, in all, as many drunken men as I have seen on a single day at a county fair in an American country village. It has happened to me, officially and otherwise, to be present often on social occasions where restraint was reduced to a minimum and where the supply of wine and beer was unlimited; and never, save once, have I seen on such an occasion a German intoxicated. Vice and crime there are in Germany —and wild defiance of all law, human and divine—and despair and suicide; but so it is in all countries. The comparison between Germany and America in this respect can only be justly made when the population shall be as crowded in this country as it is in that; when the avenues of prosperity and wealth here shall be as nearly closed as they are now there. It should be noted before leaving this subject that, happily for Germany, her drinking customs are entirely different from ours. There is no habit of standing up at bars and pouring down distilled liquors. "Treating" is unknown. Beer and wine, if taken at all, are taken with the family and socially. Temperance is almost universal. Total abstinence is almost unknown.

Again I insist that, before we claim to stand upon a higher religious and moral plane than Germany because the majority of our people adopt certain forms of belief or certain methods religious or moral which Germans do not generally adopt, we should remember that great solemn utterance, "By their fruits shall ye know them."

And now, in conclusion, let me very briefly draw from what I have hastily sketched to you some light as to the future.

And, first: look at Germany *historically*. You see that she has developed a multitude of elements of civilization, ideal and real, theoretical and practical, æsthetic and com-

monplace, civil and military, scientific and literary, religious and moral, autocratic and democratic, aristocratic and mercantile—all obliged to maintain themselves by thought and effort, each emulating every other, each forbidding any other to take sole possession of society. It was in this variety and conflict of elements that Guizot, in perhaps the most striking historical induction ever made, found the cause of the long life of modern nations as compared with the short life of ancient nations. That same cogent argument applied to Germany would certainly indicate that the multitude and variety and vitality of the elements of the new German civilization guarantee to it a career long, brilliant and beneficent.

And, finally, look at her *geographically.* To any German patriot, a view of the map of Germany is now as inspiring as it formerly was disheartening.

For that very division into a multitude of States which in days gone by was her greatest political curse, is likely to prove one of her greatest political blessings. It gives to the nation local legislatures to meet local needs. It gives training schools of parliamentary activity in every part of the empire. It gives a large number of city centres, not merely of political life, but of scientific, literary and artistic life. Each of these centres serves to stimulate every other, to check every other, to teach every other. No other European nation promises a progress so regular and symmetrical. Dresden, Stuttgart, Frankfort, Weimar, Cassel, Hamburg, Mannheim, Mainz, Cologne, Leipsic, and many other capitals, are not mere *provincial* towns from which the best life is steadily drained to the capital, and which set their glory in aping the capital. Each of these towns is a living centre, with its own marked individuality, with its own traditions and ambitions. Liverpool holds to London a relation

utterly provincial compared with the relations sustained by Dresden to Berlin. Lyons holds to Paris a relation vastly inferior to that sustained by Stuttgart to Berlin. Tissot, making a fling at Germany, says that the principal Berlin paper is published at Cologne; and, happily, there is some truth in that statement.

I see in the map of the new Germany, on one hand, a strong tie binding each State to the great military and political centre; and, on the other hand, local developments, original and varied. I fully believe that these, in their combination, are to keep Germany among the foremost powers in the world's civilization. Here indeed is the point of strongest resemblance between Germany and the United States. In fundamental political ideas and ordinary political methods we have more in common with England; but, in the form of government stamped by geography and history into the very fabric of our constitution, we have far more in common with Germany.*

Let us hope that this similarity in form may make the two great confederations more clearly understand each other and respect each other; that the feelings which led Frederick the Great, first of all continental sovereigns, to recognize our Republic may be perpetual; and that each may regard the other as a steadfast ally in the great effort to move the world toward higher views of right and duty, and toward nobler conceptions of civilization.

Well may we say with one of the truest souls ever given by the old world to the new: "God bless Germany! The future history of mankind and humanity stand in need of her." †

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* For elaborate discussion of this point, see Mr. Bancroft's despatches, 1866–1871, in the Diplomatic Relations.

† Francis Lieber to Franz von Holzendorf. See Perry, p. 414.

THE EAST AND WEST BOUNDARY LINE

BETWEEN THE

UNITED STATES AND MEXICO.

BY

GENERAL EGBERT L. VIELE.

Member of the Council.

If the north and south line of the Mexican boundary was a blunder that has been made more and more manifest each year for the thirty years since it was established, the east and west line has been shown to be an equally absurd one. If the east and west line differs from the north and south line, it is in that the former is even more desolate and forlorn than the latter in all its dreary extent. Along the former, little or no water is to be found, while the latter is entirely a water-line. In both instances the treaty was successful in developing the most useless and forlorn portion of the American continent.

It will be remembered that the original treaty of August, 1848, being based on a purely hypothetical line, was so indefinite in its terms that the joint commission appointed to locate the boundary on the ground attempted in vain to do so, and subsequently compromised on another and entirely different line than the one intended, the result of which was that the United States Commissioner allowed himself and the country he represented to be defrauded out of many thousand miles of territory. In order to remedy this, and, more particularly, to secure an improved location for the boundary, a subsequent treaty was negotiated, and an entirely new line established. An extended

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area was thereby added to the original territory ceded by Mexico. This additional territory was known as "the Gadsden Purchase," from the name of the then United States Minister to Mexico. The boundary defined by this treaty has been established with extreme precision on the ground; and this line it is now proposed to describe.

Located in conformity with those imaginary lines with which geographers seek to determine the relative positions of places on the surface of the earth, this line had, of course, no real existence until the astronomers and engineers, by the aid of the planets and the light of other worlds, were enabled to define its true position. Thus the stars that, for unnumbered ages, have looked down in calm sublimity upon these mountain-tops and trackless deserts, prove to be the only guides by which the solitudes of earth can be penetrated, disputed boundaries fixed, and the limits set to national aggressions.

While lying, for the most part, on an elevated plateau or table-land, intersected and crossed by a succession of detached mountain-chains that belong to the system of Sierras which characterize the western part of the American continent, it also passes over a sandy desert, which, like the great Sahara of Africa, formed, within a comparatively recent geological period, the bed of an inland sea.

A general elevation of land has changed the level of the surface, so that this sea, first becoming a land-locked lake, has subsequently, as the result of evaporation, been entirely dried up, leaving a vast, sandy plain below the level of the sea, destitute of vegetation and of water.

The boundary, as defined by the treaty, commences at El Paso, where the parallel of 31° 47′ crosses the Rio Grande; thence running due west one hundred miles along

this parallel; thence south to the parallel of 31° 20′; thence along that parallel to the one hundred and eleventh meridian of longitude, west from Greenwich; thence in a straight line to a point in the Colorado River twenty miles south of the mouth of the Gila; and thence along the middle of the Colorado to a point in the Pacific ocean, one league south of San Diego, California.

The additional territory acquired by the Gadsden purchase contained 26,185 square miles. On the north of the line are the United States Territories of New Mexico and Arizona, and the State of California; on the south, the Mexican States of Chihuahua and Sonora, and the Peninsula of Lower California.

Two rivers besides the Colorado cross the line, and, running northwest, empty into the Gila. They are the San Pedro and the Santa Cruz (Saint Peter and the Holy Cross); but the latter cannot be depended upon for water in the dry season. It resembles a portion of the bed of the Upper Rio Grande, where water can sometimes only be found standing in detached pools.

The line may be said to lie in a negative zone, between those two fertile zones along which civilization moves round the world—having neither the spontaniety of the one nor the vigorous growth of the other. It barely sustains the lower types of vegetable and animal life, which are alone found in that region, and which, in strange contrast to the forms of development that elsewhere obtain, afford food for curiosity, without subserving in any way a useful or necessary purpose.

This long and dreary waste of rock and desert has few or no inhabitants, and in all probability will never have any. Yet the line is crossed and recrossed in a hundred places

by roads and trails that have an interesting history, extending into bygone centuries. Along these roads have passed to and fro a people who are known only in tradition; the ruins of whose populous cities are scattered over a broad expanse of territory, and tell of a civilization higher in type and more vigorous in development than any now found there

Concerning these people there is much that is mysterious yet to be unraveled. Whether, having redeemed the wilderness and made it blossom like the rose, they finally succumbed to the pressure of outside barbarism, and thus became degraded into the miserable race that now inhabit these ruins as the sole descendants and inheritors of a fallen people, or whether they have been totally exterminated, leaving behind them no record or trace except their deserted homes—is yet to be determined. Certain it is that traces of their lives and their labors are everywhere numerous and distinct.

Along these roads, from the coast to the forest, and from the mountain again to the sea, the aborigines, the Spaniards and the Mexicans have passed and repassed for centuries.

The blood-thirsty savage on the war-path; the gay military cavalcade with pennons flying and lance at rest; the priest and friar in sombre raiment; the mild-mannered and subdued proselyte; victor and vanquished; master and slave—all have left their footprints in these desolate valleys. The remnants of *arrastas* for crushing gold found in the mountains tell of a people who were there even before the Jesuit fathers built their missions and gathered converts among the Indian tribes.

In describing the topography of the singular region of country we are now about to visit, it must be borne in

mind that its original explorers were the Spaniards, who gave to all the peculiar features of the surface which they saw local names, and in their written descriptions applied terms and designations which have been ever since retained. It is, therefore, as well that I should here insert those terms in general use by the Spaniards, and their meaning, as many of them will necessarily be also used in the descriptions that are to follow:

Mesa—A table land, table mountain, or flat ridge.

Mesilla—The diminutive of mesa—little mesa, or little table land.

Cañon—A defile or mountain pass, with no outlet on either side. A cañon is most generally the bed of a river or mountain torrent.

Sierra—Literally a saw. Indicates a mountain range that has a serrated edge, resembling the teeth of a saw.

Loma—A long mountain or ridge of hills, with somewhat smooth and flat surfaces.

Lomita—The diminutive of loma.

Puerto—A gate or gap; is used to designate a pass through the mountains.

Cordillera—A long, continuous range of mountains, composed of several ridges, as a cord is composed of several strings twisted together—the word cordillera being formed from the same stem.

Cienagua—A boggy valley, signifying the presence of a hundred springs, where the water collects and the outlet is obstructed.

Charco—Signifies a hole in clay or in the rock, where the water collects and there is no outlet.

Arroyo—A dry bed of a former stream; a deep channel made by water, but now dry. These form serious obstacles to travel along the banks of rivers.

Let us now undertake to travel over this long boundary line, with its plateaus, its sierras, its valleys and its deserts. It is a weary journey, even in imagination—no people, no homes, no fields; but only the solitudes of a continent's innermost depths, where civilization has raised its head in vain, and the herculean efforts of the highest intelligence have gone down before the resistless forces of the lowest barbarism.

Starting from the initial point of the Rio Grande, in the parallel of 31° 47′, we pass due west along that parallel. Crossing first a low mountain called Muleras, we come to a sandy valley, which was evidently at one time the bed of the Rio Grande, that, during some subsequent convulsion of nature, has changed its course on the other side of this valley. We first strike a broad *mesa*, the plateau of the Sierra Madre.

The line here leads over an apparently boundless level table-land, very sandy, and, as a general thing, destitute of grass, but thickly covered with brushwood and low sand-hills, four or five feet high.

An isolated mountain rises from this plain, immediately on the line. This is called Monument mountain, while on the right is seen the Sierra del Potrillo. From Monument mountain the line descends from the table-land and passes over a series of hills with such an easy ascent, that a loaded wagon can readily cross. Passing these hills, the road leads into a broad valley, bounded on the west by the Sierra del Carrizahillo. Beyond the hills the soil becomes

very luxuriant, and in the lower part of the valley is a beautiful sheet of water, fed by numerous springs. This place is called the Ojos Adjuntos.

Before reaching the Sierra Carrizahillo the line passes two low hills that produce a remarkable variation of the magnetic needle at a distance of three miles, indicating the presence of a very large body of magnetic iron ore. Crossing the Sierra Carrizahillo, the line now enters an open valley, and meets the great road from Yanos and Casa Grande and Chihuahua, where was located the ancient kingdom of Marata, described in old chronicles.

Passing on to a slight elevation, we reach the hundredth mile from the initial point, where the line makes a right angle, and follows the meridian until it intersects the parallel of 31° 20′. Looking south from this point along the meridian, the high mountains of Sierra de la Boca Grande (big mouth) are seen on the left; on the right the Sierra Ojo del Perro (dog's eye). The boundary line here runs through a broad valley or plain, covered with a fine grass that affords excellent pasturage.

The line now turns to the right along the parallel of 31° 20′ and passes through or over the Sierra del Perro, running for several miles over a series of rounded hills, and then, crossing a wide valley, strikes the lofty Sierra de San Luis. The soil of the valley is light and sandy, and contains a large town of prairie-dogs—those singular and interesting little creatures that seem more than other animals to imitate the gregarious habits of human beings. Posting a sentinel on its hind legs to give warning in case of danger, these little fellows busy themselves about their affairs with wonderful activity; but the most singular of all their habits is the readiness with which they afford lodgings for the rattle-

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snake in their little burrows, without appearing to be in the least disturbed by the presence of such a visitor.

From this point for more than a hundred miles the road from Yanos to Santa Cruz follows the general direction of the boundary line, crossing the Guadalupe mountains through the pass or cañon of the San Domingo river, a branch of the Gila. This river runs through a rolling prairie; but its bed is sixty or one hundred feet below the surface of the plain. Its banks are vertical and the river is not seen until the edge of the bank is reached. Near where the San Pedro crosses the line is the small town or hamlet of Santa Cruz, in Sonora. This is an important point, for the reason that a number of roads centre here that lead from Sonora into Arizona, connecting many noted places in the two countries. After crossing the Sierra de Espinola, the line enters an attractive valley that extends westward as far as Santa Rita mountains. This is the Valley of Nogales (The Walnuts), and is covered with rich green foliage—the spot in all this region that welcomes the traveller with its marked contrast to the rugged mountains and sterile plains that he has passed over, producing a most pleasing effect upon the mind, by the verdure of the Smiling Valley.

Through this valley there are roads leading in all directions. The principal one is that from Mexico to Tucson in Arizona, sixty-nine miles distant, and thence to Prescott, the capital of the Territory. This road has been the scene of many events, in the past three or four centuries, that recall the wonderful history of other days when the unknown heart of the continent was penetrated by the Jesuit monks and friars, for the double purpose of

gathering treasure for the world that is and souls for the world to come.

Following the valleys prolonged from the interior of Mexico, flanked everywhere by high sierras, they passed northward, with few obstacles, to the ancient cities of Zuñi and Cibola. Ingrafting with amazing facility the wild superstitions of the savages upon their elastic creed, they soon counted their converts by tens of thousands, and established an almost superhuman power over a race until then ungoverned and ungovernable.

The military spirit with which Ignatius Loyola innoculated the creed of Jesus here developed itself in full and active force.

The Gospel of Peace, that strode over Europe, in the sixteeenth century, clothed in a coat of mail, lost little of its aggressiveness on the new continent, while wearing a more saintly garb; and the sentiments of fear and faith were strangely mingled when the red Indian knelt in humble submission at the foot of the Cross. The narratives of the friar Marcos de Niça, in 1539, of Father Ignacio Kieler, and Sedelmayer at a later period, read like the tales of old romance; but they all tell of wonderful cities that are now no more, and of a singular race of people whose ancestors, like the ancient Aryans, worshipped a God in Nature, all-bountiful and all-beneficent.

Here on this road, although some distance from the boundary, we find the still beautiful and well-preserved Mission Church of San Xavier del Bac. The exterior walls are richly ornamented, carved and stuccoed, and the interior handsomely painted in bright colors, with many paintings in fresco. Not far from this is the former mission of Tomocacari, another fine structure, in the midst

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of rich fields, showing how carefully the old fathers selected their locations. Tubac is a town in this vicinity. Rich mines of copper, silver and gold lie in Sierra Atacosa, a league from this place.

We have now arrived at the intersection of the parallel 31° 20′ north latitude with 111th meridian west of Greenwich, and from here the boundary makes a direct course to a point on the Colorado river, twenty miles south of its junction with the Gila. The first sierra that crosses the line to the westward is that of Del Pajarito (Little Bird). This is a granitic ridge.

This region of country is inhabited by the Papago Indians, who wander over the country from San Xavier as far west as the Tinajas Altas. They were once a formidable tribe, and waged unceasing war against the Mexicans; but, having sustained repeated losses, they retired to the high peak of Babuquivari, the traditional home of the tutelary deity that presided over the destinies of the tribe.

Here, in an amphitheatre surrounded by mountain-ridges, they gathered their families and their herds of cattle and horses, and, for many days, they battled in the mountain-passes and made their last grand fight.

But they were defeated and overcome; and, believing that their deity had shown them by their defeat that they should go no more to war, they have, since that time, led quiet and peaceful lives; not even struggling against the depredations of the Apaches, the natural enemy of all that is peaceful or civilized. The consequence is that all over the country are scattered the remnants of deserted Papago rancherias.

These are generally situated some distance from water, as there seems to be among them a superstition about living

near it. The women, who do all the labor, have to bring water in *ollas*, or earthen vessels, a long distance, bearing it on their heads. They are compelled to keep very large earthen vessels constantly filled, in order to be sure of a supply. These are sunken in the ground, and have a capacity of several gallons. The tribe is comparatively well off in worldly goods. They plant and grow corn, and possess cattle and many fine horses. Nature supplies them with many useful plants. From the suwarrow (*cereus giganteus*) and pitaya they make an excellent preserve by simply boiling the fruit down without sugar. They also make a candy of the same material, as it possesses a large amount of saccharine matter. From a low-growing plant they collect the seeds, called *chic*, which are coated with a gummy substance. When placed in water they become partially dissolved, and make a refreshing drink, which, in that warm climate, is a much-needed refreshment.

The women are better dressed than most Indian women. They all wear skirts of *manta*, or calico, covering the body from the hips down. A sub-tribe of the Papagos inhabits the country near the Gulf of California. These are called Arenenos. Their principal food is salt fish, which they prepare themselves with considerable skill.

The Papagos exhibit more than any other of the tribes in this region of country the influence of the Jesuit priests, and still maintain many of the ceremonies of the Church.

Some of them remain in the neighborhood of the old missions, where, recently, two or three priests have gone among them and renewed the influence of religious services. But the dreadful cloud that is ever hanging over them is the constant fear of the rapacious and bloodthirsty Apache—their hereditary enemy.

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Among all the nomadic tribes that roamed over the continent of North America previous to the colonization by the Europeans, there seem to have been three ruling nations who, by reason of organized leagues, were enabled to dominate the weaker tribes, over whom they held an almost despotic sway. These were the Iroquois, or Six Nations, of New York; the Sioux of the Northwest, and the Apaches of the Southwest.

The first, with all its power for good and evil, has melted entirely away; the second is fast disappearing before the advancing tide of civilization; while the last, that has for centuries been the terror and the curse of Indians and of whites, is now passing through a last desperate struggle on the Southwestern frontier.

The boundary line, through the absurdities of national comity, has been for the past thirty years their most effective ally and a convenient shelter for their crimes and enormities. Crossing and recrossing at pleasure, they bid defiance to pursuit from either nation, while both alike are their victims and ready prey. Without hindrance and with little fear, they strike wherever and whenever they see fit; and instead of being intimidated, they seem to grow more bold year by year, setting up an absolute barrier to progress and civilization over a large region of country, and preventing the development of mineral wealth that is probably greater within the territory that is subject to their depradations than in any similar area of country on the surface of the globe.

They are the most numerous tribe in the southwest—their range of operations extending along both sides of the Rio Grande, from the southern limits of the Navajo country at the parallel of 34 degrees, through a large portion of New

Mexico and Arizona, Northern Texas and Chihuahua, Sonora and Durango, Mexico. They range eastward as far as the Pecos, and they are found as far west as the Pimos villages on the Gila river.

They are divided into several tribes, each of which takes its name from the district in which it is most frequently found. All of the tribes are under the control of separate and independent chiefs. The several tribes which constitute this nation are as follows: The Tontos or Coyoteros, the most westerly tribe; the Chiricahuas, that take their name from the principal mountain they inhabit; the Gileños, that infest the mountains nearest the headquarters of the Gila; the Mimbreras, that take their name from the river and the mountain of Mimbres, signifying the Willows; the Taracomes, that are found in the mountains between the Rio Grande and the Pecos; the Mescaleros, that take their name from Mescal, a liquor distilled from the juice of the Agave Americano; the Ilanos, who make their habitations in the Ilando Estacado, or Staked Plains, of Northern Texas; the Lipans and the Navajos.

All these tribes occupy positions in the mountains where, among their rugged fastnesses, they are almost secure from pursuit. To their dens they carry their plunder and their prisoners. Occupying little or no cultivatable land, they never undertake to till the soil; depending either upon the spontaneous productions of nature, or upon the plunder of the more peaceful and industrious tribes. Implacable enemies to Europeans, and to all Indians that affiiliate with them; habitually savage and brutal, they are cruel and inhuman to those who have the misfortune to fall into their hands. They are generally naked; making their incursions on swift horses, with a piece of skin for a saddle. With

little courage, they depend more upon artifice than valor. Their lives are nearer those of the brute creation than any other human beings. Even the rude shelters that they sometimes build for themselves are the most inferior that any portion of the human race are known to inhabit, consisting of a few crooked sticks covering a hole in the ground.

Leaving these wretches with the earnest hope that the time for their utter extermination is fast approaching, we will continue our journey along the boundary line.

The Sierra del Pajarito, which we now cross, is a portion of the Arizona mountains, which are rich in gold, silver and copper. North and northwest of this mountain range the Sierra Domos rise up in bold terraces. These gigantic shelves are bordered with rocks, projecting out in most fantastic shapes. On the northern slope of the Sierra Yanos another group of mountains occur, known as the Sierra Atacoosa, wonderfully rich in precious metals. On the northwest of the cordillera formed by these three mountains is the Sierra del Babuquivari. Between these two elevations is a rugged, narrow valley that is of great importance, not only for the valuable fresh-water springs that are found in it, but from the fact that it forms the only avenue of communication between the settlements in the Santa Cruz valley and the coast regions along the Gulf of California. There was formerly a considerable town here bearing the Papago name of Aribaca, or, more properly, Aribec, but it has been several times destroyed by the Apaches.

Looking northward from the peak of the Sierra del Pajarito, a rugged set of mountain ranges is spread out, and, although the single sierras do not extend very high,

they form a very bold mountain relieved by the close, uninterrupted texture of the inclined plane which constitutes them.

At the distance of about sixteen miles, another cordillera is visible, the principal sierra of which is called Escondida, from the fact that water from an unknown source trickles down its sides from the rocks above; *aqua-escondida* signifying hidden water.

This sierra is scarcely more than a mile wide, and exceeds in barrenness any that have been mentioned. The country here assumes a new aspect. Grand convulsions and volcanic forces have here, at an early period in the history of the globe, produced extraordinary disturbances. Limestone, granite and trap rocks are all upheaved in one confused and inextricable mass, and the surface is as rough and rugged as it possibly could be.

Seventeen miles to the westward is the Sierra de Senora. A prominent peak on this sierra, a few feet south of the boundary, serves as a good natural object to mark it. A league from it are "the Springs of Hail" (Los ojos de Granizo), where the soil is very rich and the vegetation profuse. From this point there is a wide, rich valley, running north and south, extending along the east base of the Sierra Babuquivari. Beyond this is the Sierra del Pozo Verde, at the base of which is the Aqua del Pozo Verde (Green Well), where there is a permanent supply of water, and where formerly was a Papago village, with the usual history of Apache violence and destruction.

The sharp and lofty peak of Bubuquivari, to the northeast, is one of the marked topographical features of the country, and has had a place in Indian traditions from time immemorial. It is venerated by the Papagos, who regard

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it as their palladium. Its great height, added to its spire-like top, causes it to act as a condenser of the water in the clouds that come in contact with it, and thereby collects in its numerous and almost inaccessible recesses an immense amount of water, and the Indians, in time of drought or war or famine, find there a safe retreat.

Looking westward from the Sierra Verde, a wide plain is visible, bounded at a distance of fifteen miles by a mountain range, traversing the country with the invariable bearing southeast and northwest. The eastern half of this plain is covered with a more than usual amount of vegetation, abounding in grass and a dense growth of brushwood and mesquite ; while the western part, a low flat, is entirely destitute of vegetation, which seems to have been destroyed by small, rat-like animals that burrow in the sides of the mountain and live off this verdure.

The range succeeding this valley is the Sierra de la Omion, which is unlike all the sierras eastward, being an isolated group rising out of a diluvial plain. Up to this point there has been little room for diluvial deposits, the whole region being so broken up by the continuous succession of mountain ranges. But westward great basins of diluvial characteristics form the main in which the sterile mountains lie imbedded, and completely isolated in a vast sea of drift.

Looking backward the country so far passed over resembles a strait traversed by long mountain reefs, while looking forward it appears like a coast of shoal water, dotted with rocky islands ; as if the *débris* of some vast Plutonian sea had, in the one instance, been forced together, while in the other, they resemble the ice hammocks in the

Polar regions, that raise their heads above the broad expanse of frozen fields.

The line now crosses a desert about seventeen miles wide, and strikes a comparatively low and narrow sierra, which presents two vertical peaks rising up like a pair of horns, that constitute a natural monument, as the boundary line falls directly between them. The name Linderos, or Landmark, has been fixed to this sierra. To the northwest and southeast lie the Sierra Arteza and Soñi, the former in the United States and the latter in Mexico, both famous for their auriferous deposits.

Beyond the Sierra Linderos is another desert, sixteen miles wide, which separates it from the Sierra la Nariz (Mountain of the Nose), a spur of the Sierra del Ajo, that takes its name del Ajo (garlic) from its structure, the main body resembling the bulbous head of the garlic. This mountain appears about eight miles north of the line. A valley about fifteen miles separates the Sierra la Nariz from the next line of elevation called Sierra de Laguna, beyond which is the valley of Sonoyta. This valley is not very wide, but it affords pasturage for a large number of cattle. Numerous springs of water issue from the earth, forming a *cienagna*, from which the river Sonoyta takes its rise ; but after running for a short distance it sinks again into the earth. Here is the town of Sonoyta, the door of Sonora from the American side.

It was once a flourishing mission, but it has become, like the towns on the Rio Grande, a resort for smugglers, and a den of profligates and refugees from justice. The Papago Indians in the vicinity are far more peaceful and civilized than the whites of Sonoyta. All this region is exceedingly rich in gold and silver.

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Then follows the bed of the Sonoyta river. A narrow but smooth pass leads to another *cienegna*, which, having but little water, assumes the general character of the desert. The course of the Sonoyta is traceable through it; but the water, except in two or three places, does not appear on the surface, and it is necessary to dig for it everywhere in the dry season. Crossing now the Sierra of Quitobaquita, the line passes westward over a broad ridge, dipping east and west to the Sierra de Salado.

The water of the Rio Sonoyta appears above ground for the last time near Quitobaquita, on the southeast of Cerros de Salado. Water is found in its bed by digging three feet; but below this it becomes so salt that even famishing mules will not drink it. This salt water gives the name to the adjoining mountains.

From this point southward the country is open, presenting to the view a cold and isolated mountain peak known as Sierra Pinacate. This peak is celebrated for its wonderful and inexhaustible layers of rock salt, stored up in immense masses, arranged in diversified strata, and of a variety of colors. West of the Salado hills a wild and waterless desert stretches out, studded with numberless isolated small peaks and a variety of elevated mounds. Southward, this desert is bounded by low ridges or rather a gradual rising of the diluvial main; north and west it is inclosed by bold and rugged sierras. A rugged cordillera, known as Tule, limits this desert on the west and breaks off what would be otherwise an uninterrupted continuation of the great Colorado waste. This is the last of the sierras traversing the State of Sonora. Westward from its crest a few rocky peaks only are visible, rising from the diluvial main like out-posted reefs along a sea coast, and are evi-

dently the tops of submerged sierras that the drift has covered to their summits.

After leaving this sierra, the Colorado desert proper is entered upon, stretching out, in an unbroken sheet of shifting sand, to the foot of the California cordilleras that separate it from the Pacific ocean.

The Colorado desert is a deep trough scooped out of the western side of the continent. Its boundary on the west is the only one that is well-defined. The cordilleras rise abruptly like a wall. On the north the line of demarcation may be drawn by the termination southward of isolated ridges and low hills. On the east the desert is considered to terminate at the Colorado river; but in reality the generally sterile aspect continues for one huudred miles east of that river. Southward, the desert extends to Sonora, and embraces the apex of the Gulf of California.

The whole area embraced within these limits bears unmistakable evidence of having been an extensive sea-bottom or broad gulf, such as is now the Gulf of California. In fact, this gulf undoubtedly extended, at some former period, over this whole area. A volcanic upheaval, within a very recent period, has caused a general rise of the surface on an east and west line, near the mouth of the Colorado river, forming thus an inland sea, which has since dried up from evaporation, leaving the bottom a considerable depth below the level of the sea.

The Colorado and Gila once poured their waters into this sea, but they were diverted by the upheaval. If the water could be restored, by means of a canal, from the Gulf of California to this area, and the Colorado and Gila turned into their old channels, the entire character of Arizona would be changed; its climate and soil would be unsurpassed,

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while its precious metals would be extracted from their mountain beds by the large population that would be found within its limits.

The boundary line strikes the Colorado river twenty miles below the junction of the Gila. This river is navigable for small steamers drawing two and a half feet of water, as far as the Gila, 160 miles. Its waters, as its name implies, are tinged with red.

The boundary line follows the middle of the river for twenty miles, until the junction of the Gila is reached. Opposite the mouth of the Gila, on the top of a mass of volcanic rock that, at some period in the past, has been thrust upward from beneath the surface, is situated Fort Yuma, an important point in many respects. It occupies a commanding position. The rock upon which it stands is an island in a desert sea—in fact, during high water, in the springtime, it is entirely surrounded, and is an island in fact as well as in topographical characteristics. The surface of the rock is 110 feet above low water in the Colorado, which, running south at this point, here turns abruptly northward, rounding the eminence on which the military post is placed.

The southern face of the rock is denuded and partly removed by the force of the current that, here meeting with the Gila, flows in a united stream to the Gulf of California.

The Colorado, north of the fort, spreads out into a wide stream, with low, swampy banks, for some miles, when it is narrowed again by the presence of volcanic rocks, through which it forms a cañon. In its course through the low lands below the fort, it is constantly changing its current and altering the direction of its channel. The confluence of the two streams at Fort Yuma is at such an angle that it

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is certain its present course is but a recent and a temporary one, that time will change. The topographical evidence, and ancient terraces and river-beds, clearly indicate that the Colorado, at a former period, flowed in a much larger volume than it does at present.

Fort Yuma is, without doubt, the most forlorn and uncomfortable station occupied by Government troops. From its bare and desolate rock it looks out upon a desert in all directions. The changing seasons bring little or no relief to the dreary isolation that makes up the whole of life in this remote region.

Winter commences in November. It is characterized by warm days and cold nights, the difference in temperature being very great. The atmosphere is dry, and little or no rain falls. Violent sand-storms come from the northwest and continue in their blinding fury for days together. Spring commences about the last of February, but without rain.

From the latter part of May the heat increases, and in the months of June, July, August and September it becomes intense, the mercury rising as high as 113 degrees in the shade. Perspiration is scarcely seen on the skin, which becomes dry and harsh, and the hair crispy. The furniture becomes so dry, and the wood shrinks so much, that many of the articles fall to pieces. The ink dries so rapidly on the pen that it is difficult to write, and an ordinary lead-pencil will not make a mark unless it is wet, and, in order to use it, must be kept standing in water when not in use. The earth under the feet is hot, dry and powdery, and the rocks become so hot that the hand cannot be held on them. Fort Yuma is the hottest military post in the United States, although it is far from being the most southerly. The

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thermometer has stood as high as 119 degrees. The influence of the great "Colorado desert" is felt through all this region of country. The desert is like an immense oven, where a hot and rarified air is generated that is spread over the surrounding country for hundreds of miles. The rain that waters the Northern States of Mexico does not find its way across the desert, the moisture being all taken up by the hot, dry air. When, in former times, this desert was covered with water, the evaporation from its surface, rising in the air, was met by the colder current from the ocean, and moisture was precipitated in the form of rain over a wide area that is now rainless for months at a time, and only occasional showers fall. The town of Yuma lies directly opposite the fort, on the left bank of the Colorado, at its junction with the Gila. It is not much of a place, its inhabitants being chiefly Mexicans and the lower orders of frontier people. It is a sort of freight depot, all freights for the supply of troops and merchandise for the people of Arizona being sent by steamer from San Francisco by way of the Gulf of California. At the mouth of the Colorado the goods were transhipped to light draught vessels and sent up the river to Yuma, whence they are distributed by land to their destination.

The alluvial delta lying north of the junction of the Gila and Colorado furnishes a soil fit for cultivation, and is occupied as much by the Yuma Indians, who are semi-civilized and a very well-disposed race. The dress of these natives is very simple. The heavily fringed kilt, made of the bark of the cottonwood or of woollen yarn, in two divisions which scarcely come together at the hips, and worn about the loins, is the fashion which obtains among the Yuma women; while the men of the tribe are encumbered

only with about two yards of muslin, and a belt or strap. The hair of both males and females is cut square across the forehead, above the eyes; the sides and back left long. The men wear it very long, as it is considered a great ornament, and braid it in rolls. The latter are used for securing their bows, arrows and clothing above water when swimming the rivers. The women do not wear the hair as long as the men.

Both the women and the men paint their faces. The usual colors are vermilion, black and blue. Some of them are tattooed. This is done by abrading the skin with the sharp point of a flint, and then sprinkling the wounded part with charcoal.

Besides the Yuma, there are many other Indian tribes scattered through Arizona and the lower part of California; among them are the Pimas, Diegueños, Cocopas, Maricopas and Pintos. Some of these appear to be offshoots from the others that have separated in consequence of disagreements between their chiefs. Years of deadly feud generally follow such a separation, and this has had the effect to produce a change in their respective habits.

At the best, they are all fast falling into debasement under the influence of their contact with the lower classes of the whites, who, driven out of more civilized regions, congregate in these desolate wastes in pursuit of the precious metals, or for the plunder of their more fortunate fellow beings. The Diegueños were at one time converted to Christianity by the Franciscan missionaries, and became partly civilized; were industrious and comparatively happy; but after the mission had fallen into decay they became utterly helpless, and are now absolutely worse than when in their original condition. A few years will, in all

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probability, see the last of these aboriginal proprietors, and their past history will only live in doubtful tradition.

What remains of the boundary-line is that portion which crosses the Colorado desert, and then, climbing the sea-coast range, reaches the Pacific ocean. Whenever the blighting influence of this desert shall be removed by the appliances of art, such as the introduction of water, the creation of numerous oases by means of artesian wells, or the planting of date-trees, which are especially adapted to this sandy soil and warm climate, then the whole face of the country eastward through Arizona and New Mexico will change its character, and, instead of being, as it is now, a region where a residence is almost a banishment and a purgatory, it will become inviting and populous. The journey across the desert is so disagreeable and attendant with so much real suffering, that most persons prefer the long trip by sea, via the Gulf of California, to the apparently shorter but more tedious journey over the desert to San Diego, than which nothing could be more desolate and dreary. Animals and even men have been known to fall prostrate and exhausted in this journey, and lie down to die in utter helplessness and hopelessness. The completion of the Southern Pacific Railway, of course, obviates much, if not all, of this inconvenience and suffering.

The coast range that separates this desert country from the ocean is rugged on the easterly slope, but on the westerly side it descends in green valleys to the sea, following which we reach the Pacific terminus of the boundary line, one league south of San Diego.

And this ends our journey. It has been a rugged one indeed, and for the most part through unfavored regions.

There are few of the elements from which civilization, even of the most primitive type, can possibly spring. Those who are compelled from the force of circumstances to inhabit this desolate region, regard their lives as a virtual banishment. Even the construction of the railway will have little or no local effect, for the soil and climate will always remain the same. And, in all probability, the entire border, from the mouth of the Rio Grande, on the Gulf of Mexico, to San Diego, on the Pacific, will always remain what it is now—the resort of the lowest orders of both nations, where lawlessness and anarchy will be the normal condition of society, and vice and crime the habitual order of things. However, the law of compensation holds good here as elsewhere in the world, and for all this desolation there is this great advantage, that the shortest trans-continental line is along this boundary, as well as the lowest line of continental elevation; that the railway through Texas to the Pacific not only gives a more speedy connection with the Western Coast, but, more than all else, it will open up to commerce, and therefore to an increased production, the luxuriant valleys of Northern Mexico and those almost equally fertile regions in the cereal zone so long almost secluded from the outer world of industry and commerce.

In all probability the next decade will witness, both north and south of this line, a most wonderful development of mineral wealth and agricultural resources. All the productions of the tropics, including coffee, tea and tobacco, and the most delicious fruits, now unknown to our markets, will come to us from those regions in Mexico of bountiful supply, in great abundance. Lateral railways will extend through Sonora and Chihuahua that will

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change the current of Mexican commerce that has hitherto, under so many difficulties, found its way to the Gulf ports.

A rapid increase of the population of these States will follow, and a marked improvement in the Mexican character for industry aud thrift will be the result; and the country beyond the boundary will, by its contrast, make us forget the dreary route by which it is reached.

Still another result will follow the completion of this line of railway.

The iron horse has already proven to be the most potent agent in subduing the barbarous instincts of the savage of the Plains, and this railway will thus become a powerful barrier against the incursions of the Apaches. They will begin to recognize as they never have before the mighty force of civilization, and how futile have now become their puny efforts to stay its progress; and, seeing this, will accept, although perhaps reluctantly, the beneficent terms which it offers to them.

Relieved from the incubus of savage warfare, the valleys that have been so long desolate will again blossom under cultivation, and yield their increase as of yore, and terror give place to hope in the hearts of the people through all this region.

TRAVELS IN SWEDEN, NORWAY, LAPLAND AND NORTHERN FINLAND.

BY

PAUL B. DU CHAILLU,

Member of the Council.

The peninsula of Scandinavia embraces nearly sixteen degrees in latitude, 55° 20′ to 71° 10′, an extent as great as that from the most northern part of the State of Maine to Florida. The boundaries of Sweden and Norway include more territory than those of any other country in Europe except Russia, its total area amounting to 294,000 English square miles. An oblique line from Northern Germany through France and Spain would equal the length of the Scandinavian Peninsula, but its greatest width is not more than seven hundred miles.

It is a glorious land, with superb mountains, deep valleys, bleak plateaux, wild ravines, numberless picturesque and clear lakes; immense forests of fir, pine and birch trees; large and superb glaciers, majestic fjords reaching far inland in the midst of grand scenery, rivulets of clear water, rivers and streams which, in their hurried course from the heights above to the chasms below, plunge in grand waterfalls. Contrasted with these are immense areas of desolate and barren land and rocks, of swamps and moorlands. There are also many exquisite sylvan landscapes by the sea and the lakes. In the north of this land the sun shines day and night.

The country, though so far north, enjoys, comparatively speaking, a mild climate, owing to the Gulf stream, whose water sweeps along the western shore of the peninsula; consequently, even very far north the vegetation is remarkable.

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The countries in America and Asia have a very cold and barren aspect compared with Scandinavia. The climate on the east side of the peninsula is colder and dryer, and the winters are also longer.

Rye, which beyond the Arctic circle is planted in the beginning or middle of June, attains a height of seven or eight feet early in August, and when first planted grows sometimes at the rate of three inches a day. Barley in some places is ready to be gathered in the middle of August, six or seven weeks after being sown. This is due, no doubt, to the days of long sunshine.

Wheat does not thrive beyond the Arctic circle in Sweden, but grows luxuriantly in the southern part of that country, especially in the province called Scania; there it takes from 110 to 120 days from sowing to harvesting. In Norway, on the coast, wheat grows as far as 69° 28′ north, and there all kinds of vegetation mature very rapidly. Rye, both winter and summer varieties, thrives as far north as Alten fjord. Barley and oats grow further north than any other grain, and on the Norwegian coast even further than 70° north.

Potatoes yield well in Sweden, even further than the Arctic circle; in Norway as far as the Alten fjord, and in warm summers as far as 71° 4′; but east of North cape the climate becomes colder. At Vadsö, 70° 40′, they cannot begin gardening before the middle of June, sometimes even later.

The Trees. The larch extends in Sweden a little above the Arctic circle; in Norway it grows further north. The bird-cherry tree (*Prunus padus*) grows in Sweden beyond the Arctic circle; in Norway, as far as 70° 20′. The mountain ash bears fruit in Norway as far as the Alten fjord, in

70°, and the maple (*Acer Platanoides*), the horsechestnut and the elm grow in that country as far as the Arctic circle.

In Norway the fir and spruce region (regio sylvatica) extends from the coast up to about 3,200 feet below the snow line, and forests of fine grown trees are seen as far as latitude 70° by the Tana and Karasjok rivers.

The birch grows to a higher elevation than any other tree. The variety *Betula alba glutinosa* grows almost as far as North cape, and in the southern part of the peninsula it grows as high as 3,500 to 3,600 feet above the level of the sea. In the higher regions the birch disappears ; the dwarf willow(*Salix glauca*), the dwarf birch (*Betula nana*), and the juniper (*Juniperus communis*) grow about 1,400 feet below the snow line, and these are seen as far as the North cape.

A little further north than the town of Haparanda, situated near the mouth of the Torneo river, one crosses the Arctic circle, 66° 32′ north latitude, and the midnight sun from the 22nd of June can be seen casting its radiance over most lovely landscapes, while further west it shines over the weird Norwegian coast and mountains.

At the North cape it is seen for the first time on the 13th of May, and remains above the horizon until the 30th of July. It disappears from November 14th until January 24th. The days lengthen so rapidly that I could read on a clear day, a book at midnight, on the 25th of April, at Vadso, a town situated a little south of North cape.

The peninsula of Scandinavia stands unrivalled in Europe for the size and number of its glaciers, and the immense fields of perpetual snow which are the fountain heads, the reservoirs, the sources of these glaciers.

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The most northern one is the Jedki, on the island of Seiland, latitude 70° 71′. The Jokel, on the Kvænanger fjord, has glaciers running into the sea. The Jostedal snow-field is the largest in Scandinavia, and is situated between the Nord and Sogne fjords, and covers a space of eighty-two English square miles, and is the source of many superb glaciers. There are many others besides these.

The Snow. The limit of perpetual snow varies. On the island of Seiland, latitude 70° 30′, it is 2,880 feet above the level of the sea. In Julster, latitude 61° 32′, it is as low as in Seiland, though much more south. In Bojumdalen Fjærland, latitude 61° 30′, it is found at 2,470 feet lower than on the most northern part of Scandinavia; while on the Dover mountains, in Lodalen, on the Jostedal, and in many others, it varies from 4,000 to 5,200 feet. The most southern glacier is found in latitude 61° 20′. The climate of Norway and the configuration of the mountains are particularly adapted for the formation of perpetual snow-fields and of glaciers.

The Fjords. All along the penninsula of Scandinavia, the traveller sees everywhere deep narrow arms of the sea winding their way often a hundred miles amidst the masses of rocks belonging to the oldest formations—these arms of the sea are called by the people fjords. Those of Norway are far larger and more majestic than those of Sweden, and partake of the grandeur of the scenery characteristic of the country.

As you gaze with admiration, almost with awe, at their walls, towering thousands of feet above the sea, the question naturally arises, what are the causes which have formed these wonderful channels? As the sea has no sweep adequate to produce them, the second thought might be that

some great convulsions of nature have led to their formation ; but neither the sea nor geological catastrophes have been active agents in the case. Invariably at their end there is a valley, with a stream collecting the water from the mountain side. These valleys in all respects are a continuation of the fjord, only one is land the other water, and both are cut out of the solid rock ; the same is true of the branch or transverse fjords or dales.

Everywhere you see the grooving, striation, and polishing due to the action of the ice ; numerous moraines, so extensive that they are often covered with farms, fields and hamlets ; everything shows that the fjords, like the valleys, have been scooped out of the solid rock by the action of the glaciers. Looking at the immense height of these walls, and adding the great depth, which is often equal to the height of the mountains, we cannot comprehend the vast periods of time that must have been required by the glaciers to do this work on their slow but irresistible march to the sea ; and we get an idea, which nothing else can give us, of the tremendous power of water, in the form of ice, in modifying the surface characters of the globe. To this day there are in Norway glaciers at the upper end of the fjords coming down to the sea, silent but unimpeachable witnesses of the work they have accomplished, and are still continuing. As they retire, month after month, they leave on the rocks precisely the same marks which they did ages ago. Time, frost and atmospheric agencies have obliterated in many places these ice-marks, and often the dirt and debris of centuries hide them from the common eye, while preserving them for the geologist.

Sailing along the fjords, the openings of the valleys, or the sheltered bays of the Norwegian coast, the attention of

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the traveller cannot fail to be attracted by the terraces, or sea-beaches, rising one over the other in amphitheatre form, looking like broad, gigantic steps. They suggest at once successive risings of the land, and different, more or less permanent, levels of the sea into which the rivers and streams have carried down stone, gravel, sand and clay, and spread them beneath the surface. In many of the fjords are short, steep valleys, whose entrance is barred by a terrace or two, surmounted by the blocks, stones, and sand of a moraine left by the preceding Glacial period. There are many lakes thus produced, following the course of the valley. The highest terrace, distinguishable from the moraine by its stratification, marks the oldest sea level. Their height depends on the width of the valley, the amount of material deposited, and the duration of the subsidence; the oldest strata reach a height of 600 to 620 feet, and contain marine arctic fossils. Marine shells and shellbanks of two distinct faunæ are also found in the clay. In the hard clay marls have been discovered skeletons of seals and fishes, and large peat-beds occur in the plains. The lower and more recent terraces, from 50 to 150 feet high, contain fossils belonging to the present faunæ of regions below the polar circle on the coast of Norway. Immense banks of marine shells run parallel with the coast, and over them is a dark mould, as at Podö. Other great beds also occur below these later terraces.

Shore-lines, composed of cobblestones, are met in different parts of the country. I have seen them on the northern shores of the Baltic, in the midst of coniferous forests, three in number, one above the other; also on the coast of Finmarken, back of Vardö. Seamarks are seen on several points of the coast or Norway. I have particularly noticed

them near the city of Trondhjem, where they are found at a height of 462 to 516 feet; near Stensö, on the Stavanger fjord; in Oxen fjord, 138 feet above the level of the sea, and also in Alten fjord. These marks do not correspond exactly with the height of the surrounding terraces, and must have been produced by the action of the waves, and would be much more common had not time and frost obliterated them in many places. The terraces, the shore-lines, and the sea-marks point to the great rising of the land during the so-called "Terrace epoch," and to long periods of repose. But if the above-mentioned facts indicate the upheaval of the land just before the present era, there is also proof that there has been in some districts a subsequent local sinking. There are several distinct submerged steep beaches on the island of Gotland, at a distance from the present cliffs, which, owing to the clearness of the water, can be distinctly seen from the shores.

The peninsula of Scandinavia presents very interesting geological and physical features. A great part of the country was uplifted above the ocean at a very remote period, and there is no other region which exhibits at the surface, comparatively, more extensive areas of the primary rocks constituting a large portion of the oldest crust of the globe.

A gulf formerly passed from the Arctic ocean, at Archangel, across Finland, which was then at the bottom of the sea, down to Gotland, or even farther. This is determined from the presence of fossil shells (such as Yoldia pygmæa), in the boulder clay of the coast of the Baltic and central parts of Sweden, now found only in the latitude of Spitzbergen.

The fundamental rocks are gneiss, mica-schist, hornblende,

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chloritic slates, and quartz; gneiss is the most prevalent, occurring as gray or red gneiss, hornblende gneiss, etc. Among the eruptives granite is the most common in Sweden, occurring with syenite everywhere. Pegmatite, or graphite granite, generally occurs in veins. Mica-slate and clay-slate occupy much less extent than the granite and gneiss. In some districts of Norway, between the coast and the mountains, the azoic mica-schists include veins of eruptive masses, especially granite and serpentine, and sometimes green stone; even the more recent rocks are thus penetrated; occasionally the old granite mountains are diversified by slates.

The Kiölen range comprises a chain following the boundary line from the Skjæker mountains in the north to the Faxefjeld in the south; in the north its rocks are imperfectly known, but the central part has sparamite in the middle, Trondhjem slates on both sides, and granite and gabbro masses both in the central axis and in side lines.

In the extreme northern part of Norway the primary rocks are less prevalent, being mostly covered with more recent rocks, consisting of slates, sand and limestones of different kinds. In Finmarken, of eruptives are found gabbro, greenstone and granite, though not so extensively as in other parts of Norway. Central Norway is chiefly of sparamite formation, with overlying clay, slates and quartz in broad belts.

In Norway there is much hornblende and quartz slate, gray gneiss and green slate, either one forming the principal rock, or the gneiss overlaid by the slates. In many of the great granite ranges are rich quarries of felspar.

All the ores of Sweden occur in the oldest azoic formations—copper, nickel, iron, silver, cobalt, phosphate of

lime, and gold in small quantities; in some districts the iron is titaniferous, and occasionally entirely above the surface.

The Silurian strata are most developed in central Sweden, while in Norway they occur principally in the Christiania valley. The Devonian formations are found only on three islands in Lake Mälar, as shown from the characteristic fossils. The carboniferous formations are entirely wanting. The geological formations between the carboniferous and the post-tertiary are not found in Norway and Sweden, with the exception of the lias and chalk formations, which are found in Scania and Blekinge, and a few mesozoic strata in Finmarken. The post-tertiary rests directly upon the paleozoic. The post-tertiary formations of Sweden and Norway show that, notwithstanding the great changes of surface experienced by the more southern portion of the European continent, the Scandinavian peninsula, up to comparatively recent times, has preserved nearly its ancient relative level above the sea, with the exception of the lias and the chalk in its southern part.

There is a group of islands not far from the Norwegian coast, beyond the Arctic circle, between lat. 67° and 69°, called the Lofoden. They are unsurpassed in their wild beauty; a tempestuous sea beats almost all the year against their rocky walls; the warm Gulf stream laves their shores. As one sails among them their fantastic forms are ever changing in appearance, some of their peaks appearing like needles against the blue sky. Their outlines stand out clear and sharp, and their purple color grows dimmer and dimmer as they fade away from sight, like a vision of the sea. No wonder that in ancient times the mariner regarded them almost with reverence, and believed that a

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malström should guard their approach from the south, so beautiful are they.

In consequence of the great masses of water which the tides force through the narrow sounds between the islands of Lofoden, the current becomes exceedingly strong and forms the so-called *malström*, which is the strongest between Lofoden cape and Mosken; this, while being without the significance ascribed to it, can in winter, during westerly gales, run in strong whirls, and with a speed of twenty-six miles an hour, according to official statistics. Looking from them towards the mainland, a hundred peaks can be seen on the mountains clad with snow and glaciers, and from the bare brow of the coast the Lofoden appears like a gigantic uneven wall rising from the sea.

The Lofoden are famed for their cod fisheries, which begin in the latter part of January and last until the beginning of April. At that time the rocky and deserted islands become full of life; thousands of fishing-craft come, and hundreds of vessels are seen nestled safely among the islands. The codfish in untold numbers make their appearance, whence no one knows, to spawn. They begin to arrive in January, and leave at the end of March or at the beginning of April, migrating towards the North cape and along the Finmarken coast; they then disappear for the year.

The fishing station of Henningsvær is formed by the island of that name and Hellandsö, making a natural canal between the two islands. In the fishing season an unexpected sight bursts upon the traveller: a fleet hitherto unseen is at anchor. At one time I saw there seventy-five sail; these were composed of sloops, schooners and cutters,

with crews aggregating 328 men. Most of these vessels bought their fish directly from the fishermen; several had stores, and sold sugar, coffee, ship-bread, tobacco and many other things. There were 688 fishing-boats; 351 had come to fish with nets, the remainder with hook and line; the crews of all numbered 3,337 men. Craft laden with fish, some almost to the water's edge, were going to and fro, stopping alongside a vessel to make a bargain, putting their loads on board or making for the land. Immense quantities of cod were piled one upon another on the shore, men were busy opening and cleaning them, and tens of thousands of the fish were hanging upon poles to dry. Numerous log-houses were surrounded by barrels filled with cod-livers, and every rock covered with their heads. Hundreds of boats lined the shores, crowding the narrow channel. Great numbers of eider-ducks, as tame as those on the farms, were swimming to and fro, seeming to know that no one would harm them.

The Norwegian Government exercises a paternal care over the men who form such an important part of its population, and who contribute so much to the wealth and prosperity of the country. If it were not for the fisheries many districts of that rocky coast would be uninhabitable. Small hospitals are built on several islands; during the fishing season doctors sent by the State attend to the sick, giving their advice free; medicines only are paid for, and at a rate that merely covers their cost. A very small duty is paid on the fish sold, and the revenue from this source is applied to defray the expense of medical attendance. There was a project for building a large hospital on Henningsvær. The sale of spirituous liquors and of intoxicating drinks is wisely entirely forbidden, and during my two

weeks' stay I saw but a single intoxicated man; he had brought his liquor from some point outside the fishing jurisdiction. This abstention from intoxicating drinks recalls to mind the warning given in the old laws of the Vikings (*Vikingabalk*):

> Wine is Valfader's (Odin's) drink, and
> An inebriation (*rus*) is welcome to thee
> If thou canst sensibly bear it.
> The one who is reeling ashore can brace up;
> But to Ran (daughter of Aegir, God of the Sea) reelest thou here (on the sea).

The fishing season, as has been said, commences at the end of January. From the 24th of January to the 8th of February, the fishermen can not put out from shore before seven o'clock; afterwards to a date fixed, they cannot go out before six o'clock; from the 22d of March to the 14th of April, five o'clock. The cod fisheries are virtually closed after the 14th of April.

Two kinds of boats are used; one is open, from thirty to thirty-five feet long, and six to six and a half feet beam; the Finmarken boats are longer—they have a house on the poop—being from thirty-five to forty feet and more in length, and from seven to seven and a half feet beam; a pole several feet long is attached to the rudder, and held by the last rower, who steers as well as pulls, thus saving the labor of one man. Their cabins are about eight or nine feet long, affording protection at sea and sleeping accommodations, as the men do not return to land every day. There are also little craft, used for transporting the fish from the shore to the vessels; these are not more than nine feet long by four feet wide.

Winter. How great is the contrast between summer and

winter on the peninsula of Scandinavia ! In the far north a sombre sky hangs over the country ; but even at the end of December, which is the darkest period, when the weather is clear one can read from eleven o'clock A. M. to one P. M. without artificial light. All nature seems to be in deep repose ; the gurgling brook is silent, the turbulent streams are frozen, the waves of the lakes upon which the rays of the summer sun played strike no more on the pebbled shores. The land is clad in a mantle of snow. Day after day the atmosphere is so still that not a breath of wind seems to pass over the hills ; but suddenly the periods of repose are succeeded by dark and threatening skies and violent tempests. Under the fierce winds the pines bend their heads, and the mountain snow is swept away to immense heights, hiding everything from sight.

The great belt of snow seems to be between 62° to 65°. The severest snow storm that took place during my sojourn in Scandinavia was in the month of January, and lasted seven days—from one Sunday to another—without interruption.

It is necessary to know how to walk with snow-shoes, and, if travelling in the far north, to know how to drive with reindeer, in order to enjoy the pleasures of winter.

The climate from the Arctic circle northward is steady in regard to cold weather, the thermometer ascending rarely as high as the freezing point, and ranging from that degree to 40° to 48° below zero, the period of intense cold rarely extending more than three or four days at a time.

The *aurora borealis* sends its flashes and streamers of light high up towards the zenith, and there are days when

the electric storm culminates in a corona of gorgeous color, presenting a spectacle never to be forgotten.

In the far north the winter is the travelling season, as then the rivers, lakes and marshes are frozen, and one can roam over the roadless land with rapidity by reindeer, or may go eastward to the White sea and the land of the Samoïdes—to Siberia, if he chooses; westward and northward over the mountains to the Norwegian coast. In Sweden and Norway there are post-stations, where reindeer may be procured. Houses of refuge, built by the Swedish and Norwegian Governments to shelter travellers, are found in the districts where there is no population. No one should ever travel in these bleak regions in winter without knowing where these are situated, for otherwise he is sure to meet his death by storm.

The snow-shoes used in Scandinavia are very unlike those of the Indians in North America, and are far superior for speed and comfort, requiring no spreading of the limbs. At the first glance one may think them clumsy, on account of their great length. Those used in a mountainous or wooded country are the shortest, and generally six or seven feet long; those used in Jemtland and in some other parts of the country measure sometimes fourteen to sixteen feet. They are made of fir wood, about one-third of an inch thick at the centre, which is the thickest part, and four or five inches wide. There is a piece of birch at the centre, and over this is a loop through which the instep of the foot is passed; the part near the foot is convex, so that the weight of the body cannot bend the shoe downward. The under part is very smooth, with a narrow furrow. Both ends are pointed. In the north the boots or shoes are specially adapted to snow-shoes, they being

pointed, without heels, and so large that the foot can be surrounded by a so-called lapp grass (*carex vesicaria*). With two pairs of home-made woollen stockings one can defy the cold, no matter how low the temperature may be, but the foot must be perfectly free.

Snow-shoes must not be raised, but slid one after the other, unless when going down hill; then the feet are kept side by side if possible. For a beginner the great difficulty is to keep the two shoes exactly parallel, and prevent them from becoming entangled with each other. It is very difficult to walk on the crusted snow. The ascent of the hills is made in zigzag, and is hard work for those not accustomed to it. But the most difficult of all is to descend the steep hills, as the momentum and speed are very great; it is even quite dangerous in mountainous regions and where boulders are uncovered; it is safe only for those who have practised from childhood, for the speed is as great as in coasting. In descending, the two shoes must be parallel and close together—a very difficult task. One must have a long stout staff for a rudder and guide, to be used on the right or left as occasion requires, and the body must be bent forward. I have never been able to descend in this manner. In going down hill, he who cannot imitate a Scandinavian or Lapp, must ride a staff, resting upon it as heavily as he can, taking care also to keep the shoes even. The staff acts as a drag, and prevents him from going too fast. The natives can go easily ten or fifteen miles an hour when the snow is firm and in good condition, and travel one hundred to one hundred and fifty miles a day.

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Travelling with Reindeer.

The conveyances used in Lapland are peculiar. The *kerres* used either to carry people or merchandise is very much the shape of an open boat, and is made of narrow fir planks, very strongly ribbed inside, about seven feet long, two and a half at the broadest part, varying but little in width. The keel is very strong, about four inches wide, but varies much in thickness, as they wear out in time by constant rubbing. The higher they are the quicker one can travel; as in case the snow is well packed or crusted the sides hardly touch it, and the keel then acts like a runner under a skate. *Pulkas*, built for fast travelling, have keels about two and a half inches thick. The higher they are the more difficult it is to learn how to balance one's self, and consequently not to upset. Each conveyance is drawn by a reindeer, and carries a single person. All have on the forward part a strong leather ring, to which the trace is fastened. The harness is very simple, the common one consisting of a collar round the neck, at the lower part of which a single twisted or leather trace is fastened, to which the conveyance is attached. No bit is used, and the rein is made of strong plaited leather straps, and fastened to the base of the horns. The rider seats himself, holding the rein twisted round the right hand. The line must not be held tightly, and the middle part should not quite touch the snow, for it is dangerous should the rein get under the sleigh; in this case the driver's arms may become entangled, and he be dragged some distance before he can loosen the cord round his hands. A novice, therefore, must be constantly on the watch. If you want the reindeer to stop the rein is thrown to the left; if you wish to go fast, then to the right.

The most difficult and dangerous time in driving is in descending steep hills, as the speed of the sleigh is greater than that of the reindeer. The Lapps sit astride, with their knees bent, using their feet as rudder and drag. To a novice the practice is very dangerous, and might lead to his breaking his legs. They never would allow me to come down in this manner. In going down I used a short stick, the point of which I would force into the snow with all my might, this acting as a drag. But sometimes the hills and mountains are too steep even for the Lapps. In that case a reindeer is tied behind the conveyance; they cannot bear to be pulled by the horns, and consequently they make strong efforts to free themselves, and in so doing greatly lessen the speed. It is also very difficult to learn how to balance one's self, so as to keep the equilibrium of the pulka and prevent upsetting; the greater the speed the more difficult is the task. For example, when a deer after swiftly going down a hill, turns suddenly a sharp curve, the rider must bend to the other side, or he will be overturned.

The reindeer are not housed like horses or cattle, and they are left to roam, in the forest, the people going after them when they are needed—they have to find their own food. In winter, under the thick cover of the snow is buried the rich moss of which the animal is so fond—so you see often all the reindeer of a herd busy digging, first with one forefoot then with the other; the holes gradually become larger and larger, and the bodies of the animals become more and more hidden. At last they reach the moss—then only their tails are seen above the snow. A strong reindeer can draw from 200 to 400 pounds, according to the country.

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Every load in Swedish and Norwegian Lapland is drawn in the boat-like sleigh, and by one animal only. Amongst the Samoïdes several reindeer are harnessed together to one sleigh. If the country is mountainous, a spare reindeer is taken in the descent of very steep hills.

All over Swedish and Norwegian Lapland churches are scattered, so that the Laplander may easily attend a church, enjoy the privileges of religion, and partake of the Lord's Supper; and, when his days are ended, his body is carried thence to the graveyard. Near the church are schools, where the children are taught and the clergyman imparts the precepts of religion.

At the solitary farms and little hamlets of Lapland the sickly are left, and the kind care of the farmers is repaid, as I have said before, by presents from Lapps, and by taking care of their reindeer. In these hamlets, sometimes very far from home, the young people are confirmed, and finish their religious education. In the church they are baptized, and around it they are buried. The church to them is a sacred and beloved spot; they repair to it with joyful hearts, and all those who can, at certain times of the year, make it a point to participate in its religious services. The Laplanders always come and partake of the Lord's Supper at Easter, before they go with their herds into the mountains for the summer, to be absent several months.

The Laplanders may be divided into the following classes, according to their habits and manner of life: (1) The Mountain or Nomad Lapps, who live upon the increase of their herds, and wander with them all the year around from pasture to pasture, living in tents—these possess by

far the largest number of reindeer; (2) The Sea Lapps; (3) The Forest Lapps; (4) The River Lapps; (5) The Fisher Lapps. All are descended from the Mountain or Nomad Lapps.

Russian Lapland has an extent of about 13,000 square miles; Swedish, 10,500; Finnish, 6,000; Norwegian, 3,500; in all 33,000 square miles. Some parts of Russian Lapland are covered with large forests of coniferous trees; these occupy about 3,000,000 acres, while the hills and valleys towards the north are chiefly clad with dwarfed birch, but there are also extensive tracts of tundra, or treeless desert.

In Norway and Sweden the Lapps are found as far south as 62° in the provinces of Herjedalen and Jemtland, and in Hedemarken and Trondhjem; but very few inhabit these two large Norwegian provinces.

The mountain Lapp's time is engaged in attending to his herd, to which he and his family devote all their energies, for their welfare depends on the growth of the animals.

According to the late census there are in

Sweden (1870)	6,702	Lapps	with	220,800	reindeer
Norway (1865)	17,178	"	"	101,768	"
Finland (1865)	615	"	"	40,200	"
Russia (1859)	2,207	"	"	4,200	"

Norwegian Nordland includes that part of the country which extends from about latitude 65° to 70° on the coast, and comprises the old province known under the name of Halogaland, and which is now divided into Nordland and Tromsö provinces, while Finmarken is farther

north. The scenery on the shores is the wildest on the coast of Norway, and culminates in its savage and weird grandeur between the cities of Bodö and Tromsö; there the loftiest mountains are found, the highest being between the Lyngen and Ulfs fjords, with an altitude of 6,500 feet, and present the characteristics of the Alps.

Fishing is the chief occupation of the inhabitants; many of the farms are owned by fishermen. Wherever there is a good harbor one is sure to see some houses, or a fishing village, consisting of several families, who have settled together.

Finmarken is the most northerly province of Norway; at its extremity is North cape in latitude 71° 10′, nine hundred and eighty feet above the sea level. This bold promontory is a huge mass of mica-schist, rising dark and majestically from the sea. From there as far as the eye could reach is the deep-blue Arctic sea, disappearing on the northern horizon. Far beyond is that unknown region guarded by a wall of ice, which bars all approach.

On Magerö, at the head of a small fjord, towards the end of July, I saw thick green gneiss, dotted with buttercups and dandelions, violets and forget-me-nots, with stems more than a foot long. The dwarf birch and willows were abundant. Springs and streams seemed to burst from the earth, and the rays of the sun poured warmly into the narrow dell, which is the greenest little spot to be found anywhere so far north.

The transition from winter into spring is wonderful. On the 10th of May I encountered a snowstorm about one degree north of the Arctic circle--the snow was deep, the Torne river was frozen; but as the sun was warm and the

snow melted, the ice over the river was in some places unsafe. On the 17th of May there were still four feet of snow in the surrounding forests by Pajala, which is some twenty or thirty miles north of the Arctic circle. During the day the mercury reached 45°–48° in the shade, and 86°–88° in the sun; the nights were still cold, the thermometer marking 20° above zero. Every day the weather became milder. On the 22d of May it snowed, but the flakes were large and damp. On the 23d it rained—the first rain of the year—a thick mist falling all day, with the thermometer at 42°.

The spring was now coming on with rapid strides, although earlier than usual. On the 29th of May the highest temperature was 63° in the shade and 104° in the sun; on the 30th, 66° in the shade and 105° in the sun, with about the same temperature on the 31st; and the last three nights had been without white frost, which the people said was over. The grass in sheltered spots by the rocks was green; swallows made their appearance, and cuckoos were heard in the woods. These were the forerunners of summer, and the people hailed their appearance with joy. The birches were yet leafless, but the buds were ready to burst forth, and the pines and firs had already started with new life. People were busy everywhere ploughing and manuring the fields. At the farm of Vara Perrai, about nine miles south of Pajala, I saw on the 29th of May the men ploughing, and a mother, two daughters and myself sowed barley. The Vara Perrai farm was said to be more forward than those around Haparanda. The last week in May had been a hard one for the farmers. When Saturday came all were well-nigh exhausted, and the day of rest was waited for as the day of relief.

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Vegetation seemed to grow visibly, the heavy mass of snow had disappeared on the protected fields, the buds of the birch trees had opened, the meadows were green almost all over, nature smiled everywhere, and one could hardly credit the sudden transformation.

On the 16th of June only a few more drifts, protected by the rocks, were to be seen. The birches, with their young leaves, presented a charming sight; on many of the fields the barley had now germinated. The season was a few days in advance of the one I had spent in 1871, when I was on my way north.

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